The Creative Processes in Video Game Development:

A Model Set Illustrating the Creative Processes with Theoretical and Practical implications

By

W. Paul Kohler

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THE UNIVERSITY OF WARWICK

Dedicated to my wife Sylvia

Table of Contents

List of Figures, Charts and Tables, and Drawings

List of Figures

List of Charts and Tables

List of Drawings

List of Abbreviations

BAFTA	British Academy of Film and Television Arts
GMC	Gold Master Candidate
GTM	Grounded Theory Method
CCM	Core Creating Mechanism
CC	Creative Continuum
CS	Creative Spectrum
DLC	Downloadable Content
CBC	Create-Build-Create building process
CB	Create-Build building process
C&B	Create-and-Build simultaneous building process
CM	Creating Mode
RPG	Role Playing Game - a specific game genre
P&L	Profit and Loss (statement)
OED	Oxford English Dictionary
ROI	Return on Investment
IP	Intellectual Property

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Declaration

Except for commonly understood and accepted ideas, or where specific reference is made, the work reported in the dissertation is the result of my own work and includes nothing that is the outcome of work done in collaboration. No part of the dissertation is the same as any work that has previously been submitted to any university for any degree, diploma, or other qualification.

W. Paul Kohler
Centre for Cultural Policy Studies
University of Warwick
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Abstract

This thesis sets out to examine the creative process in developing large TV console video games. Using methods based on the philosophy of Grounded Theory, interviews were conducted at four game development studios. From these interviews and the extant literature, a Model Set was constructed to reflect the creative process. The underlying premise of the Model Set is that a Darwinian process of variation, selection, and retention, is the kernel of the creating process. The Model Set is comprised of four components: a rigorous domain specific definition of the creative process, a defined perspective, a Core Creating Model, and a Creative Continuum. The Core Creating Model is the mechanism of the creating process, while the Creative Continuum provides a platform to evaluate the video game in terms of the creative definition. Following from the Model Set are four key research findings as contributions to knowledge and current research directions. These findings are:

1) Creativity is not all about ideas, as commonly perceived. Decision-making is a fundamental element of creativity,
2) The Core Creating Mechanism provides a distinction between Creativity and Discovery, while placing both within an understandable context,
3) The Model Set challenges the common assumption that more creativity is better,
4) The creative process is structured in multiple ways. It is of critical importance to understand these difference structures when researching and managing the creative process.

The creative process in video game development is not monotonic: it is bimodal, that is, there is creativity both at the beginning and at the conclusion of the development process. Not all creative processes follow this pattern. The Model Set and four key research findings are a contribution to knowledge as they expand and deepen our understanding of the creative process. From these findings, the thesis discusses the theoretical and practical implications of the research.

CHAPTER ONE

THESIS INTRODUCTION

> We *all* have a creative side, and it can flourish if you spawn a culture to encourage it, one that embraces risks and wild ideas and tolerates the occasional failure. We've seen it happen.
>
> Tom Kelley, General Manager IDEO
>
> *The Art of Innovation* (p. 13)

Introduction

The thesis sets out to examine the video game development process.[1] This creative process occurs at the intersection of two large cultural currents within Western Society that have come together over the past thirty years. First is the fascination with creativity, particularly in the business world. Naturally, all companies on the cutting edge of their domains, aspire to (if not acquire) the label of 'creative'. Indeed, it seems that old, well-established companies must re-invent themselves to acquire this magic accolade. However, if you cannot be creative, being 'innovative' will do – but either way, it is important to generate the ambiance and enthusiasm of being different and exciting, and deliver it in the form of new and valuable products and services. The second cultural current is the now ubiquitous combination of young people and video games. Today, having a TV video game console in the household is a natural part of raising children; there is the expectation by them and their peers that it will be in the lounge. Furthermore, a new gaming wave is in the process of breaking. These are social games played on-line in real time between friends: on Facebook, on our iPads, iPhones, or any internet-

[1] As opposed to alternative perspectives of the creative individual, the creative content of video games, or those aspects of the environment that influence creativity.

connected device. The industry is at a new gaming frontier, pushing gaming deeper into the social fabric. At a convergent point of these two sweeping currents, is an impressive £25 billion worldwide retail industry. The core of the market consists of large, expensive-to-produce video games. The research sets out to understand and model the creative process used in developing these video games for the home TV consoles.

We all know what creativity means, we use the word all the time. We know what is creative when we see it, and we know what we like. The concept is ubiquitous. Creative products are ubiquitous and aspiring creative and innovative companies are ubiquitous. Yet when we start defining the concept for research as a prelude to understanding the creative process, it becomes a slippery, over-used concept, with multiple meanings that shift from context to context. Some researchers believe it is indefinable (Torrance 1988:43). For this research, a rigorous definition required development that was appropriate to the context under study. The definition of creativity and the creative process is a topic returned to more than once in the thesis.

Section One: Research and Researcher's background

In the autumn of 2006, the original research proposal included in my University application was:

> What are the central elements of the creative process, or processes in game development companies? When, how, and where do these elements work most effectively?

In the autumn of 2007, at the beginning of the research, the topic had expanded somewhat to recognize that there were tensions existing between the creative process elements, and how were these tensions influencing the video game development. A supplemental comment went with the revised proposal that expressed more of the research intent than the earlier statement. The comment was:

> A holistic analysis of the multiple aspects of creativity in entrepreneurial video game companies as it involves the leaders, the teams, the technologists, and the artists.

The intent was to understand more about ‘creativity’ and the factors (i.e. specific identifiable manageable influences) that influenced the development of video games at various levels of the organization. Leaders and managers could use the subsequent understanding to increase the creative quality and output of their organizations. There was the intuitive feeling that leaders and managers were as creative as the commonly accepted ‘creatives’ (e.g. designers, artists.) were in an organization, but were so in a different manner with different objectives. That is, ‘creativity’ was omnipresent throughout the organization; but different organizational levels dealt with different subject matter, and creatively operated in different ways. The intent, therefore, was to identify what ‘creativity’ was at the different organizational levels in the organization, and identify the factors that influenced that creativity.

As the research progressed, the latter proved an impossible task. The main obstacle was that the research topic was too broad, as it involved leadership, group and team dynamics, and studying the organization as a single entity. Furthermore, there was enormous complexity involved in multi-level understanding and analysis. The second obstacle was the lack of a comprehensive framework, or over-arching theory that reflected an understanding of the creative process in project specific environments. At the end of the second year, a decision was taken to build a model of the creative process as the focus of the research. Subsequently, a four-part Model Set evolved that provided perspective on the creating process of video game development incorporating a rigorous and context-workable definition of creativity and the creative process. The Model Set includes a mechanism explaining how the creative process occurs, and situates the resulting creative output on an understandable substrate.

In a circuitous manner, the result of the research was to return to the core of the original 2006 research question:

> What are the central elements of the creative process, or processes in game development companies? When, how, and where do these elements work most effectively?

The research for the most part answers these questions. It identifies the elements of the creative process as ideas, decisions, execution, and iteration. These four elements combine into a mechanism (the Core Creating Mechanism, or CCM), which while operating in a distinct set of methods (Modes) describes the kernel of the creating process. The mechanism, paired with a method to evaluate creative products, provides a framework to understand the creative process in video game development.

The reasons for conducting the research were twofold. I have been interested in creativity from my graduate MBA work, when creativity was something very mysterious, little studied and very little understood. I was intrigued, and remained so throughout my long business career. The second reason is somewhat more straightforward. Prior to starting the research project, for the past seventeen years my business was as agent and business affairs manager to more than twenty-five independent video game development studios. Some of these companies were very successful; some were marginal, and some failed. I had some understanding of *how* these outcomes occurred from a business and leadership perspective, based on my earlier extensive business experience. The intriguing question was *why* these outcomes occurred, and from a creative perspective,. The video game business is all about delivering creative games. The research sets out, in part to answer that personal question.

My background has relevance to the research. I am seventy years old with over forty years successful business experience. The first twenty years was with one of the early Silicon Valley electronic companies, where I held positions in international finance, marketing, and senior management. The latter was as General Manager of a sophisticated technical ceramics production organization with responsibility for a one hundred-person factory. The following five years were with a major US video game publisher, starting in International finance, and concluding as an International Vice President. This company was engaged in the same core game business as the publishing company of the research. Subsequently, as an entrepreneur, I established a very successful agency representing independent video game studios to the game publishers. Consequently, there is an extensive understanding of the video game business from multiple viewpoints, residing on a deep general management background.

Section Two: Thesis Outline

The thesis develops over eight chapters.

Chapter One describes the research question and its background, as well as that of the researcher. The thesis chapters are briefly outlined, and the chapter concludes outlining the four contributions to knowledge.

Chapter Two first identifies some of the key research assumptions, and the ontological premises of the research are articulated. To clarify further these key assumptions, the limitations of the research are noted. The chapter then addresses the research methodology, both in theory and in practice. The three field interview phases are described.

Chapter Three provides the background to understand the nature of the video game business, the publishing companies that develop these games, and the large financial risks inherent in publishing video games. Judging the quality and value of a product is a critical aspect of understanding the creative process. The industry has an unusual source available to it for judging game quality: an independent third party provides game ratings, and the industry participants generally accept the results. After discussing the quality rating mechanism, a statistical study establishes the relationship between sales and the quality ratings. Maximizing sales and profits is the raison d'etre for publishers, generally the higher the quality, the higher the sales, and hence the higher value to publishers. Video games development uses a staged-gate process, which is then outlined. To publishers, video games are expensive high-risk projects. To the individuals engaged in the development process, the risks are high at the reputational level. These risks are clearly articulated; they are background winds that constantly circulate through the creative game development process.

Chapter Four covers the theoretical literature supporting the research analysis. A discussion of the critically important task of establishing a definition of creativity and the creative process is undertaken. I propose a working definition for the research context, with clarification of the components. An overview of the psychology creativity domains and organizational creativity domains provides a research background. From the literature, four foundational models are discussed. These models are the work of Campbell (1960), Simonton (1999a), Sternberg (1999), Drazin et al (1999), and Csikszentmihályi (1999). Campbell, as further developed by Simonton, provides an evolutionary Darwinian based mechanism in order to explain the mechanics of the creative process – how creativity occurs. At the core, it is a variation, selection, and retention model. Sternberg (1999) proposed a categorization of eight types of creative contribution. After reclassification, his observations form the basis of a continuum of creative products. Drazin et al's (1999) observations provide an expansion of certain core elements of the creative mechanism, and their method of operation in a real world context. The system's view of Csikszentmihályi (1999) provides a linkage and overall interactive context between the creative mechanism, the field that judges the creative efforts, and the domain into which the creative product is absorbed. The contribution to knowledge that the thesis makes is the integration and expansion of these four models into an integrated Model Set, resulting in theoretical and practical insights. Four key research findings are presented. The specific theoretical literature on video game development is sparse. The chapter concludes with a review of F. T. Tschang's writings to provide additional contextual material on the practical and theoretical understanding of video game creative development.

Chapter Five examines the individual parts of the creative process, and develops these into two models – the Core Creative Mechanism (CCM), and the Creative Continuum (CC). Part One of the chapter covers the four discrete creating elements of the first model – Ideation, Decision, Execution, and Iteration – the Core Creating Mechanism (CCM). The critical aspect of decision-making receives extensive discussion. Part One concludes with the deconstruction of the CCM into four operating Modes, which reflect the manner in which the CCM operates in practice. The analysis moves the understanding of the CCM to a deeper level in the form of an operating toolset – tools used for specific tasks in the creating process. The individual tools are familiar in theory and practice, but now presented in an integrated framework that enhances the understanding of the complete creating process. Part Two presents the Creative Continuum, a model to suggest an idea's path of incremental changes. The Creative Continuum is segmented to label and describe different gradations of creativeness. The Creative Continuum reflects the working definition of creativity as ordinal (degree of value) and nominal values (degree of newness). The concepts of chaos and negative creativity at the ends of the Creative Continuum are introduced. The chapter concludes noting that the creative process is not only about ideas; it is the interaction of the four elements of ideas, decision-making, execution, and iteration. The critical nature of decisions becomes apparent. The creating process is fraught with decision errors, a number of which are discussed. Of critical importance, is that only by decisions releasing ideas into action, does the creative process occur.

Chapter Six provides the interviewees' comments and illustrations of the Creative Continuum, the CCM and the four operating modes. The interviewees comment in their own words, on the parts of the Model Set and the Creative Continuum. In addition to commenting on the Model Set, three significant findings emerged from the field interviews: the bimodal nature of video game development, the tension between the ideation (by the creatives) and execution (by the suits) elements of the CCM, and the critical nature of leadership in setting the creative process constraints.

Chapter Seven sets out to address the implications of the Model Set. The chapter begins by returning to the question of the definition of creativity and the creative process in light of the Model Set, and the field observations.

Subsequently discussed are the implications of the research on the current theoretical literature. The primary conclusion is that much of the current literature is overtly constricted in light of the dynamic nature and breadth (reflecting the four Modes) of the creating process and the variability of the creative product. There is no single creative process, just as there is no single creative product, but there is a range of creative processes and a range of creative products. The chapter concludes on a pragmatic note. The four CCM Modes are presented as a specific set of tools – as management instructions to drive the creating process.

Chapter Eight presents a short synopsis of the individual thesis chapters. Suggestions are made for future research along three planes: fundamental research into decision-making process and the creating process, horizontal research to examine the operation of the CCM into different domains and different build processes, and lastly research into specific operations of the CCM Modes. The chapter concludes with an assessment of the research results against the research question.

Section Three: Contribution to Knowledge

The thesis contributes to knowledge, both from theoretical and practical viewpoints in a number of ways. At the centre of the thesis is a four-part Model Set. The Model Set provides an integrated framework to understand the creative process. Part One provides a working definition of creativity and the creative process appropriate for the research context. With the ambiguity surrounding the definition and meaning of creativity, the working definition provides the keystone. Part Two constrains the framework by providing a single perspective or lens, by focusing on the creative process, rather than the creative individual, the creative environment, or the creative product. Part Three of the Model Set, suggests a creative mechanism, the Core Creative Mechanism (CCM), the mechanism by which the creative process occurs. Part Four, situates the product of the CCM on the Creative Continuum, a substrate for understanding the 'creativeness' of a product, while at the same time incorporating a value component. The 'creativeness' and 'value' of a product on the Creative Continuum are reflecting the definition of creativity in Part One of the Model Set.

Following from the Model Set are four key research findings that both reflect and give elucidation to the creating process. These key research findings and contributions to knowledge are:

1) Creativity is not all about ideas, as commonly perceived. Decision-making is a fundamental element of creativity,
2) The Core Creating Mechanism provides a distinction between Creativity and Discovery, while placing both within an understandable context,
3) The Model Set challenges the common assumption that more creativity is better,
4) The creative process is structured in multiple ways. It is of critical importance to understand these difference structures when researching and managing the creative process.

The Model Set and four key research findings are more fully developed in the body of the thesis.

Additionally, a number of important operating observations were developed:

1) The ideation element and execution element of the Core Creating Mechanism reflect the organizational tension between the creative (idea) individuals, and the business (execution) individuals. This tension is both is in flux during development, and is dynamically manageable by the organizations leadership.
2) It is the organization's leadership to ensure the 'value' and 'newness' constraints for the game.
3) The modes of the Core Creating Mechanism can be used as an operating toolkit.

SUMMARY

The chapter has described the background and development of the research question and the background of the researcher. The thesis' chapters were outlined to provide an overview of the work. The chapter concluded with the presentation of the contribution to knowledge as the four key research findings and three important operating observations.

The following chapter address the underlying ontological assumptions, thesis limitations, and the research philosophy and methodology.

CHAPTER TWO

METHODOLOGY

Introduction

The chapter opens outlining the ontological assumptions of this thesis. Creativity as a concept is both unclear (as discussed in the following chapter), and has developed many myths in its usage (Berkum 2007). The articulation of these assumptions removes potential layers of ambiguity. The limitations of the thesis are then noted.

Ground Theory was chosen as the most appropriate framework for this research. The Grounded Theory Method (GMT) is outlined in theory and practice. In field work interviewing and analysis, the theory's standard research methods were not effective in developing the thesis' ideas. However, the philosophy underlying the GMT was most effective. Within the GMT general philosophical framework, it allowed the researcher's experience and knowledge of the industry to gain a deeper understanding, and to develop the models of the creative process.

The field research went through three distinct phases, the latter stages building on the contributions of the former, as the iterative practical aspects of the GMT made their contributions.

Section One: Ontological Assumptions and Thesis limitations

A number of premises are foundational to the research. Ideas are the source of all creativity, and individuals are the source of all ideas. At the individual level, Sawyer has expressed these attributes of creativity very eloquently (2006:74). They are tabulated below.

Ontological Assumptions

- Creativity is not a special mental process, but involves everyday cognitive processes.
- Creativity is not a distinct personality trait; rather, it results from a complex combination of more basic mental capabilities.
- Creativity does not occur in a magical moment of insight; rather, creative products result from long periods of hard work that involve many small mini-insights, and these mini-insights are organized and combined by the conscious mind of the creator.
- Creativity is always specific to a domain. No one can be creative until they internalize the symbols, conventions, and languages of a creative domain.

Table 1 Ontological Assumptions

Creativity is not the sole domain of geniuses, although some people are better at generating creative products than others (Simonton 2010a). One of our most important bedrock premises is that anyone can be creative (Mumford, Whetzel and Reiter-Palmon 1997, Smith and Finke 1999, Ward 2004, Mumford et al. 2002, Runco 2004b):

> Creativity in the context of work is possible in any job or by any employee (Shalley, Gilson and Blum 2000), given the appropriate conditions. (Shalley 2008b:3)

Therefore, no specific group of individuals could or should be omitted in the organizations studied. Leaders and managers were as much a part of the field research as generally accepted creatives such as artists and designers. The research was not about, or restricted to a special group of individuals. The only limitation was that they worked for an organization developing large video games. Again, a foundational premise is that anyone can be creative.

The research does have some limitations.

Limitations

This research concerns defined projects, that is, specifically closed-ended products – video games. Constraints, such as, budget, time requirements, resources (including talent) are identified in advance, or become established during the product's early Pre-Production phase. This is in contrast to an on-going production process, such as in an automobile factory or oil refinery where there is the relatively constant output of similar products. The observations and models may not be as valid, or require modification, in process production environments as distinct to a project-based environment.

As part of the thesis research design, there are very few references to individual video games. For the most part, readers of the thesis may not be familiar with individual games that date rapidly. In the early stages of the field research, while discussing a current hit video game, two knowledgeable individuals articulated diametrically opposed answers. One indicated the game was 'very creative,' the other that it was 'just' a recombination of old game elements, and no 'big deal.' It was not productive for the research to venture into individual products. References to individual video games have thus been minimized.

The thesis does not address the creative aspects of individuals, either as individual talent or in the creative dynamics of groups. Excluded are the internal individual 'mechanisms of the mind' – those processes, which generate ideas and make decisions. As recently as 2009, Colin Martindale pointed out 'let us remember that psychology is a young science, and we know very little about the manner in which the mind works' (2009:117). Specialist sociologists, psychologists, and neurologists are more appropriately able to make progress in understanding the mechanisms of the mind. The research does not address the environmental factors that affect the creating process at the individual, group, and organizational levels.[2] These perspectives are also important and influence aspects of the creative process, but are outside the scope of the research.

Both a limitation and strength of the research, is the extensive experience of the researcher. A pragmatic orientation, games industry experience, general business background and optimistic orientation come from the creative cradle of California's Silicon Valley. On the positive side, the experience has acted as a filter to select those ideas, in the literature and the field interviews, which are relevant to getting a creative product shipped to market. It permits insight into issues – the insight ranges from 'That is not the way it really happens,' to 'This is the way we/I did it.' Many ideas, however interesting and insightful, but marginal or irrelevant to creative tasks, were filtered out and bypassed. The criterion for relevance was how importance and effective these ideas were in an operating context – that context based on the researcher's long experience. Certainly grey hairs, industry background, and an ability to get to the essence of any issue, were invaluable in the field research interviews.

On the less effective side, the internal dynamics of today's organization tone is far different from the researcher's early career: it was very much 'command and control' as opposed to today's more consensus management style. This tended to place more decision-making authority and accountability with the senior individuals, rather than the taking into account the influence of group and team members. Further, with significant experience, there is a tendency to 'jump' to conclusions, reflecting a 'been there, done that attitude,' which can shut down avenues of thinking and dialogue, and thereby potentially missing significant insight and understanding.

[2] Anderson et al (2004) argued that all the facilitators of innovation at the individual, group, and organizational level have been 'reliably identified.'

The ideas and models presented in this research are empirical, in the sense that they reflect the real creative problems in developing video games. However, they are not empirical in the 'rigorous sense of methodically categorizing and selecting cases on which to examine and test the full range of possible hypotheses' (Heifetz 1994:7). They provide insight and perspective into the creative process in video game development based on field research and personal experience, rather than a rigorous scientific research process based on the stating and testing of hypothesises.

Section Two: Methodology – Theory

As there was no overarching theory found relevant to the research topic to develop or extend. The Grounded Theory Method (GTM), an inductive qualitative approach, was chosen as the most appropriate research method. It was an excellent method to use starting from a de minimis position in regard to field interviewing and the creating process. The case study approach within the qualitative paradigm was not deemed appropriate, as to study a single game development project would take eighteen to thirty-six months, which was outside the time frame of the study. There were a number of appealing aspects for the GTM method:

a) It provided a detailed understanding of the research context, and took advantage of the field research opportunity available.[3]
b) The approach was qualitative rather than quantitative. It is based on an interview process.
c) As the approach was open-ended, it allowed a change in research emphasis as the research progressed.
d) The researcher is part of the research process, that is, my experience could be a contribution to the findings (based on Saunders, Lewis and Thornhill 2007:120).

[3] Permission for interviews with two large and important industry organizations had previously been obtained.

An important feature of the GTM was that during and after the field collection, there is a process of re-interacting with the field with the knowledge earlier gained to further refine and develop the research understanding. Karen Locke describes this as a ‘conception of knowledge as *emergent*’ (2001:34). The foundational literature theories were of some considerable assistance in the development of the Model Set. As Eisenhardt has suggested, ‘An essential feature of theory building is comparison of the emergent concepts, theory, or hypothesis with extant literature’ (1989:544).

One of the important aspects of the GTM process is achieving ‘theoretical sensitivity.’ Locke notes that researchers need to be:

> …sufficiently ‘theoretically sensitive’ in order to be able to conceptualize their data (Glaser and Strauss, 1967: 46). They emphasize that ‘the root sources of all significant theorizing is the sensitive insights of the observer himself ‘(1967:252) … The notion of theoretical sensitivity, it seems to me, rests on the premise that researchers cannot apprehend something unless they are equipped with a perceptual apparatus, including the language terms, that allows them to discern and pay attention to it: an apparatus that is sensitive to it … Theoretical sensitivity, also, can be derived from sources outside of the researchers’ disciplinary domain, for example, from personal experiences outside the research situation. (Locke 2001:89)[4]

My seventeen years in the video game industry was essential and irreplaceable in establishing theoretical sensitivity in the research situation. This prior experience was invaluable in placing me within context, and answering the self-question ‘What did we/I do’ in working through some of the theoretical questions that arose during the research.

[4] Barney Glaser and Anselm Strauss were the originators of the Grounded Theory Method with the 1967 publication of *The Discovery of Grounded Theory.*

The GMT is a formal method starting with data collection, then:

1) Naming data incidents (coding)
2) Comparing data incidents
3) Creating conceptual categories
4) Integrating categories and their properties
5) Delimiting the theory
6) Theory development (Lock 2001)

Each stage is building in complexity and understanding on the prior stage. As mentioned earlier, knowledge emerges from the data into theory. A key aspect of the GMT is 'data sampling' whereby the emergent knowledge is sampled back into the data collection process to test robustness and assist in further knowledge development. As explained below, the formal GMT method was abandoned in the second interview phase, as this structured approach was not developing robust categories. However, in an informal intuitive manner the categories and subsequent theory development were occurring. The result was the development of the Model Set. Data sampling was extensively used during the second and third interview phases. What can be observed is that although the formal structured GMT process was not followed, the GMT philosophy was definitely used.

However, the critical question is 'Did the GTM philosophy and underlying methodology work?' I am of the opinion that the answer to that is yes – having developed the Model Set from the field research and considering the foundations in the extant literature. Locke posed the question this way:

> Grounded theory acknowledges its pragmatic philosophical heritage in insisting that a good theory is one that will be practically useful in the course of daily events, not only to social scientists, but also to laymen. In a sense, a test of a good grounded theory is whether or not it works 'on the ground,' so to speak. (2001:59)

Chapter Seven (Discussion), addresses the 'practically useful' question to both social scientists and layman, giving an affirmative answer.

How did the GTM work in practice during the field and theoretical model development?

Section Three: Methodology – in Practice

With the assistance of a very senior industry executive, two video game organizations were made available for in-depth interviews. The first was a large independent game development studio (240 employees), where the first six interviews were conducted. The second was a major international publishing company (500 plus employees), where the remaining interviews were conducted. The latter had three development studios, two of which were some distance from the headquarters and significantly possessed their own cultures. Essentially four different organizations were interviewed, with one studio being interviewed twice, once early in the schedule with the second interview session conducted at the end of the schedule. The research had the support of both organizations' CEOs, which was important in arranging the interviews and as regards the attention and focus given by the interviewees.

Thirty-one interviews were conducted over an eleven-month period starting in November 2008 and finishing in November 2009. Six individuals were interviewed a second time. One senior manager was interviewed three times. The interviewed individuals were:

CEOs	2
Exec/Sr. Managers	11
Directors/Managers	10
Programmers/Artists	2
Total	25

The interviews were primarily with senior level individuals, stemming from the request that the interviewees have at least ten years' industry experience reflecting the Hayes Rule (Hayes 1989). Hayes found that it took ten years immersed in a domain before making any creative contribution. The objective was to ensure the interviewees had sufficient industry experience to contribute to the discussions. The interviews lasted from one to one and half hours. Agendas were always prepared in advance and at the start of the interviews, and shared with the interviewees. The interviews were audio recorded, professionally transcribed, and then personally audited against the master tape for accuracy, local dialects, and industry jargon. In every first interview, a photograph was taken of the interviewee and included in the transcriptions. It was a helpful aid in keeping an intimate and personal contact with the person and material in subsequent research work. A pad and pencil were always available during the interviews. It proved very successful in assisting the interviewees to express their thoughts in drawings and charts.

I maintained confidentiality in three ways. A Confidentiality and Non-Disclosure agreement was signed with each of the organizations participating in the research. Second, at the start of first interviews it was explained and emphasized that anything mentioned in the interview was subject to 'four-walls,' and would not be further discussed with any other member of the organization. Lastly, during the interviews at any time that sensitive material came into the discussion, the interview content was carefully steered away as not being relevant to the subject under discussion.

The interview style was assertive; at times 'pushing' the interviewees to expand their thoughts by asking them 'what did they mean,' 'asking them to expand further,' 'playing back what I thought I heard,' and 'proposing ideas/frameworks/charts.' In the excitement of discussing ideas, this tended on occasion to cut off an interviewee's thoughts, but overall, it significantly expanded and deepened the subject areas under discussion. It also had the benefit of keeping the interviews focused on the agendas.

Section Four: Interview Phases

Phase One

The interviews went through a number of phases. The first phase was the six interviews with the independent development studio. In many ways it was an invaluable interview learning experience – the questions were very broad and there were too many. The subsequent interviews had smaller and better-focused agendas. In these early interviews, the questions revolved around general questions of creativity in the organization, the interviewees' department, the current project and its processes, and the interviewees' creative process. A number of significant findings came from these interviews. The significant findings were firstly the bimodal aspect of the game developing process, which came out in the first interview. That is, there was high creative effort at both ends of the development (start and finish), with a less creative period in the middle. The second significant finding was the importance of game 'Vision' at all production levels of the teams became apparent. This was a very early indication of the hierarchy of Ideas, an important concept developed in the research that is discussed in Chapter Five (The Creative Process Models).

Different levels of the organization dealt with different aspects of the creating process that affected the final product. It was an early indication that in the creative process, leaders and managers have different creative functions, a significant topic developed in the thesis.

The interviews were transcribed into NVivo 7, a computer software program for qualitative research, to begin the process of developing early concepts. Coding, an analysis method, began shortly after the transcriptions were received and corrected.

This part of the process allowed me to begin to identify the emergent themes in the research, in particular the bimodality of the creative process with the implication of different creating processes, and iterative nature of game development.

Phase Two

In the second phase, from interviews number eight to number sixteen, an early version of Core Creating Mechanism (CCM), was discussed in the interviews. During the course of these interviews, the central Core Creating Model significantly matured – the most important development was the central role that decision-making is to the creating process.

The formal Grounded Theory Method (GTM) methods employing NVivo 7 was no longer used, as this was not producing the necessary synthesis to higher levels of understanding.[5] It is also likely that a high level of 'theoretical sensitivity' had been achieved, and Nvivo 7 was therefore no longer necessary. However, the core precepts of the GTM philosophy continued to be followed. A central tenet of the GTM was utilized extensively, being the testing of tentative findings with the interviewee – the data sampling process. During this and the subsequent phase, an intuitive approach[6] was taken, relying on experience to guide research development, and using core theoretical concepts of Campbell (1960), Simonton (1999a), Sternberg (1999), Drazin et al (1999), and Csikszentmihályi (1999) as an underlying foundation to build understanding and development of the Model Set.[7]

[5] There is the possibility that I was not using the software correctly, or was inappropriately trained even after taking a training class. There is also the possibility that NVivo was inappropriate to my learning and research style.
[6] That is, while staying within the planned agendas, allowing the interviews to be more open in following up interesting and relevant discussion topics. Confidence was also increasing that these interesting topics were highly productive for the central research themes.
[7] The theoretical concepts of these authors are more fully developed in Chapter 3 (Literature Review).

Phase Three

Langley suggests that there are three ways in which theory is built: induction (data-driven generalizations), deduction (theory driven hypothesis testing), and inspiration (driven by creativity and insight).

> "Inspiration" may be stimulated by empirical research, by reading, by thought experiments, and by mental exercises (Weick 1979, 1989), but its roots are often untraceable. It draws indiscriminately on formal data, experience, a priori theory, and common sense. It works when it succeeds in creating new and plausible connections between all of these that can be made explicit as theoretical products … (Langley 1999:708)

In coming to research conclusions, the methodology was a combination of the inductive use of the GTM philosophy, some deduction based on the extant literature, and the inspiration derived from experience.

The remaining interviews followed a central theme, with a number of subthemes. The central theme explored was the Creative Continuum, which became a major part of the Model Set. The subthemes were: decision-making, the tension between the creating functions (creatives) and the execution functions (suits), leadership in the setting of constraints, and the operation of the creative process segmented by functions (i.e., design, art, programming, and management) during the different phases of the development process. The latter was not successful in directly developing the Models as no definitive conclusions could be developed and it turned out to be a poor research trail to follow, as each function (e.g., design, programming, and art) saw their creative task differently during the central Production Phase. The other subthemes became important elements in the overall findings. In reviewing the individual interviewee agendas, the research themes and findings were becoming more focused and refined. This was particularly true in the last five interviews. These were second interviews with one of the publisher's studios, which because of the excellent rapport established from the prior interviews, made for very direct and productive discussions. A core model, the Creative Continuum, was discussed extensively, and a number of the key findings continued to be explored.

The integration of the two individual models, the Core Creating Model and the Creative Continuum Model, into the four-part Model Set occurred during the writing of Chapter Six (Empirical Support) and Chapter Seven (Discussions and Implications) when it became clear that they were part of a larger integrated framework. In addition to the Model Set, the key four findings became clarified in the writing of these chapters.

CONCLUSION

The chapter opened articulating the ontological premises on which this thesis rests, to minimize the inference of the many myths surrounding the concept of creativity. The limitations inherent in the thesis were noted. The Grounded Theory Method was the method chosen for the research, but it was found that the broader GMT philosophy was effective in guiding the research, rather than the more prescriptive detailed GMT methods. The GMT in theory and practice were discussed.

The chapter closed with a description of the three distinct phases of the research. From the theoretical perspective, the thesis now addresses the structure of the games industry, an outline of the game development process, and the implications for the creative process used therein.

CHAPTER THREE

VIDEO GAMES AND THEIR INDUSTRY

> *Game development is [creative], I would be hard pressed to find another industry that is creative as games, people that work in games are just so creative all the time, it is ridiculous how creative they are, they are thinking in a creative way constantly.*
>
> Art Manager (Interviewee 1:8)

Introduction

The chapter examines the video game industry and game development to provide context for subsequent chapters.[8] As with any large and dynamic industry, it has unique characteristics. The chapter opens with a discussion of the industry's nature. Major points emphasized are the size and competitive nature of the games market. The special nature of games is explored, as interactive experiential products that are fun and engaging.

The chapter then turns to addressing 'quality' and 'creativity' in games by describing how they are judged by the marketplace. A statistical analysis demonstrates the relationship between these ratings and sales. The analysis then turns to how these market ratings may be used, and how the notion of quality as 'production values' is conceptually different from creativity in the game development environment.

The chapter then proceeds to an outline of the stage-gate development process, an understanding of which is important in the discussions of the game creating process

[8] Henceforth the thesis will use the singular 'game' as a representative example of a large team based TV console game production using 75-100+ individuals with a direct production cost in the order of £14,000,000. This is distinct from mobile games, handheld games, and all PC based games.

covered in Chapters Five and Six. The chapter closes with an example of a game's profit and loss statement (P&L), which then leads into a discussion of the business risks of game development.

Apart from setting the context of game development, a theme running through the chapter is the difficulty of developing a successful game in a competitive, high-risk environment.

Section One:

The Nature of the Video Games Industry

In 1998, the UK Government's Department of Culture Media and Sport Creative Industries Mapping Document defined the video games industry, as well as software in general, as part of the 'creative industries' (DCMS 1998:4) as Leisure Software. The definition of the 'creative industries' has been generally accepted to mean 'creativity is an input and content or intellectual property is the output' (Potts and Cunningham 2008:233; Galloway and Dunlop 2007). Recognition has both legitimized and defined the game industry as 'creative.' Some contemporary writers have gone further to suggest that games may now be considered an art form (Smuts 2005). For the industry participants there is no question but that the industry is creative. It is the central reason for their career choice, and they would be slighted by any suggestion otherwise.

A distinguishing feature of games, as with many other cultural products, is that they are approachable and relatively easy to relate to on a personal level. That is, with a little game experience, an observer can see a game being played and can generally understand the nature of what is happening. Observers are capable of making product judgements such as 'That is a good game,' and 'That is not the kind of game I like, but I can see why other players might enjoy it,' or 'That game sucks.' This contrasts with most industrial products, such as racks of commercial electronic hardware or insurance contract, which for most people, are outside the realm that they relate to on an emotional level. There is a different from many ‘artistic’ products, which require a higher level of expertise or educations (i.e., ‘cultural capital’) to appreciate, highlighting the difference between ‘art’ and ‘popular culture.’ One does not have to play games (even just watching them being played is enough) to understand their aesthetics, their ability to engage players, or their commercial potential.

Organizations that compete in creative industries must deal with a combination of ambiguity and dynamism, both of which are intrinsic to goods that serve an aesthetic or expressive rather than a utilitarian purpose. Managers involved with the creation, production, marketing, and distribution of cultural goods must navigate a set of tensions that arise from opposing imperatives from these industry characteristics. Lampel and his colleagues (2000) have beautifully articulated the core tensions that leaders and managers must address in the creative industries. In the games industry, the first challenge is to resolve the differences in outlook and objectives between artistic values (as seen by the industry ‘creatives’) and the economics of entertainment (as seen by the suits). The artistic or creative individuals are striving to maximize game aesthetics and gameplay, while the resources available are severely constrained by the overall risk profile and the need to meet organizational revenue and profit objectives. Secondly, the games must have enough creative differences to distinguish them from others in the market and yet stay centred on meeting the mass market to maximize potential sales. Thirdly, the leaders and managers need to develop the ability to anticipate future developments in the market and build the necessary resources to address these future creative, commercial, and economic requirements in a competitive manner. A distinguishing feature of these games is their multi-year development cycles to reach the market in two or three years’ time. Long-range product planning is required over at least two product development cycles.

That is, the tasks are to deliver the current game in development while simultaneously developing resources for the following game. The resource requirements over the extended period will need to include creative, technical, marketing, management, and production talent, as well as assembling the required economic resources. Fourthly, they must balance needs of vertical integration within the organization; that is to say, they must build the necessary core competencies, and at the same time, explore the opportunity to use advanced external resources. For example, does the organization develop its own proprietary in-house technology, or obtain it from an external supplier? It is the classic ‘make or buy’ decision with all the risks and complexities involved. Finally, but not least, they must build a culture that supports the creative desires and goals of all individuals. This is no easy task. And, while building the culture, they must at the same time grow an organization that can efficiently deliver a continuing stream of games, on time and on budget (Lampel, Lant and Shamsie 2000).

These tensions are common to most creative industries whose leaders and managers cope with them on a day-in-day-out basis, and are just the facts of any creative industry. From a particular individual’s perspective engaged on one side of a particular tension, frustration may often develop. It is the job of the organization’s leaders and managers to resolve any organizational problems caused by these tensions. It is not a choice between one side and the other of a particular tension, but maximization of ‘both’ and ‘all’ that is necessary for a successful game production and organizational development. The leadership of any creative organization must then: balance the tension between artist values and entertainment economics, be creative enough (but not too creative) to meet mass market entertainment requirements, meet both the short term product delivery tasks while building the organizations capabilities for the future, and build a culture that nurtures all the necessary creative talents. All the while, meeting the required organization's revenue and profit requirements.

The following section discusses the context in which these games and organizations are situated.

<u>The Industry</u>

The video games industry was born in the mid-1970s with entry into the home of inexpensive cartridge games played on the television set in the family lounge. In the late 1970s and early 1980s, the video games industry was commercially 'hot' with the overall market leader Atari carrying the accolade of the fastest growing company in the history of the United States. The leading companies were the darlings of California's Silicon Valley and Wall Street. Then in 1982-3, the retail market crashed and closed its doors to video games, and the industry all but went into oblivion. One of the most famous game failures was *E.T., the Extra Terrestrial,* a game based on the movie's success. The game was rushed to market anticipating taking advantage of the 1982 Christmas selling season. The results were a commercial disaster. It is reported that of the five-to-six million copies produced, only one and a half million sold and the balance were dumped into a New Mexico landfill along with other titles the market would no longer accept. Game machines saturated household penetration; there was no innovation in terms of either hardware of software. The public became bored and the market vanished.[9] Industry observers were declaring the industry dead (Schilling 2003:8). Shortly thereafter, the market began to grow again with the very successful NES machine from Nintendo. From this nadir, the industry is now a $41 billion dollar (£25 billion) worldwide behemoth. During the succeeding years, the hardware companies Microsoft, Sony and Nintendo

[9] Interview 29 March 2010, Anton Bruehl then President of Atari International

marketed a series of ever more powerful consoles, with a stream of interesting and creative games (Williams 2002). Game console sales for software and hardware for 2009 were[10]:

North America	Hardware	$ 7,949,000
	Software	$ 11,363,000
		Total $ 19,312,000
Western Europe	Hardware	$ 6,592,000
	Software	$ 9,722,000
		Total $ 16,315,000
Japan	Hardware	$ 2,312,000
	Software	$ 3,478,000
		Total $ 5,790,000
Grand Total	Hardware	$ 16,853,000
	Software	$ 24,563,000
		Total $ 41,417,000

Table 2 Worldwide video game sales

From the 1985 low point, this represents an impressive record of industry growth. In terms of number of users, over the last seven years, it is estimated the growth has been from 230 million gamers to 1.3 billion, a four hundred per cent growth rate.[11] In contrast worldwide box office (including Asia Pacific and Latin America) for all movie films reached $29.9 billion in 2009, according to the Motion Picture Association of American in a recent report.[12] That is, within the last twenty-five years the game business in the

[10] International Development Group. April 2010. *The PC and Video Game Markets: North America/Europe/Japan.*
[11] Electronic Arts financial presentation 10 March 2010 http://files.shareholder.com/downloads/ERTS/804149742x0x357925/38d47ff2-13f1-4bce-9203-cb7d8d2ce916/Wedbush%20Presentation%203.10.10.pdf (accessed 1 May 2010)
[12] Theatrical market statistics, 2009 Motion Picture Association of America. www.mpaa.org/MPAATheatricalMarketStatistics2009.pdf (accessed 30 March 2010)

Western World and Japan has achieved greater sales than the film industry with its long history. This considerable accomplishment is not generally recognized.

Quite apart from the economic impact, game consoles have achieved impressive household penetration. In 2009 in the approximately 114 million[13] US households, the penetration rate is Wii with 29.5 million units (26%), Xbox 360 with 20.3 million units (18%), and PS3 with 12.4 million units (18%). The comparable figures for UK household penetration of approximately 18 million[14] households is even deeper, with the Wii at 6.5 million units (36%), Xbox at 4.5 million units (25%), and the PS3 at 3.0 million units (16%).[15] Many households have more than one game machine so the household penetration figures are not net additive. However, we can probably say that in both the US and UK households, somewhere between a third and a half have video game consoles. Thus, in one way or another, games are a large factor in the life of many individuals and families.

Three large companies manufacture consoles: Nintendo with the Wii (31% total hardware market), Microsoft with the Xbox 360 (26%) and Sony with the PS3 (16%) in 2009 for the US market.[16] The remaining market is Nintendo's hand-held players (DS series) with a market share of 15%. Both the console manufactures and independent publishers fund development, manufacture finished goods, inventory finished games, and market games into the home market. The software shares of US market are as follows:

[13] http://www.census.gov/prod/1/pop/p25-1129.pdf (accessed 15 April 2010)
[14] http://www.statistics.gov.uk/cci/nugget.asp?id=8 (accessed 27 May 2010)
[15] International Development Group. April 2010 for installed base figures.
[16] International Development Group *US Video Game Market Update: '09 in Review and 2010-'14 Outlook, January 2010.*

Console Manufacturers		
	Nintendo	18.8%
	Microsoft	3.8%
	Sony	3.8%
		26.4%
Independent Publishers		
	Activision/Blizzard	20.1%
	Electronic Arts	16.4%
	Ubisoft	4.8%
	Take 2 Interactive	4.2%
	THQ	4.1%
	All others	24.0%
		73.6%
	Total	**100.0%**

Table 3 Console Manufacturers and Independent Publishers

There is market concentration on the software sales with the three largest players collectively controlling a dominating fifty-five per cent of the market. Nintendo dominates among the hardware manufacturers, Activision/Blizzard and Electronic Arts are dominant in the independent software market, and three smaller publishers tag along with each less than 5% market share. The overall characteristics of the market show both concentration of market power in the major companies and intense competition in both hardware and software.

As with the other entertainment industries, the game software segments into a number of genres. While the industry does not completely agree on the description of the genre segments, the major genres are:

- Strategy
- Sports
- Simulations
- Shooter
- Role-playing
- Racing
- Fighting
- Adventure
- Arcade

Not only is there intense competition within each of the genres but the unit sales volume is concentrated at the top of the market with a few titles taking the majority of the sales. Of the approximately 670[17] Xbox, Playstation 3, and Wii titles that were in the market in 2009, the sales concentration was: top 5 titles took 27% market share, the top 10 titles took 36% market share, and the top 20 titles took 48% market share.[18]

As a further indication of the 'hits driven' market, the following US 2009 sales funnel shows the same result from a different perspective.[19]

< 100K unit sales:	**89% of sales (4,286 titles)**
100K- 500K units:	**8.6% of sales (411 titles)**
500K-1M units	**1.2% of sales (56 titles)**
>1M units	**0.7% of sales (32 titles)**

Table 4 Unit Sales Chart

As a rough guide on the investment cost of large games concentrated at the top of the sales charts, the development costs alone (without marketing and corporate overheads) can run to anywhere from £15,000,000 to £25,000,000 with profitability requirements of 1,000,000 to 2,000,000 unit software sales.[20] It is an understatement to say that few

[17] Source International Development Group direct communication
[18] Electronic Arts 10 March 2010 presentation.
[19] International Development Group *US Video Game Market Update: '09 in Review and 2010-'14 Outlook, January 2010.*
[20] A detailed example is discussed later in this chapter.

games meet the necessary unit sales volumes. The concentration of a few titles at the top of the sales ranking is a further reflection of the nature of this intensively competitive industry.

As mentioned above, the growth has come from the continued enhancement of the TV home consoles in terms of raw processor speed, improved graphics and, most importantly from the flow of ever more interesting and market successful games. In the past, there have been generational upgrades in the hardware every four to six years. The present generation of hardware (Xbox 360, PS3, and Wii) seem to be in a longer cycle, with a full new hardware cycle not expected to start for a number of years.

Currently, the industry is moving into a potentially disruptive phase as the impact of the internet begins to encroach on the existing retail business models. In the past, the industry has successfully embraced the internet with on-line multi-player functions becoming an essential component of many games. The industry is now assessing the potential of direct distribution to the consumer (bypassing retail) of both full games and/or downloadable content (DLC). The DLC can potentially take the form of incremental game enhancements (e.g., purchasing a more powerful sword) or episodic content. Looming out there somewhere are the unknown impacts of 3D digital imaging[21] and cloud computing,[22] which have the further potential of significantly disrupting the industry. In many ways the games industry is similar to the film industry where a few large generalist firms dominate the business (Mezias and Mezias 2000). Both these industries are hits driven businesses (i.e., where a few titles dominate total sales). In both industries, the product life cycle in the marketplace is short. If the film or game is unsuccessful, they are

[21] Similar to the current production of 3D films now in theatres worldwide.
[22] Games are run from a central computer facility, rather than from a local home TV console.

off the screen or shelf within days (Epstein 2005, Robins 1993). Another commonality between these two industries is the extreme difficulty in forecasting both product acceptance and final sales volumes of the creative products (De Vany 2004, Tschang 2007). Without accurate sales forecasts, it is very difficult to judge the appropriate level of investment for new films or games.

In summary, the games industry has achieved impressive growth over the past twenty-five years, and it is now in an intensively competitive phase. There is excitement tinged with uncertainty coming from the continued impact of the internet. The sales charts are dominated by a few titles, with few others meeting the necessary sales volumes to meet publishers' profitability requirements. It is an exciting industry, games are fun, but it is a hard place in which to invest and conduct business, as it is very competitive and very risky.

The section has outlined the overall nature of the industry, and discussed the context in which the games and business organizations are situated. The chapter will now discuss the distinguishing features of the games themselves.

Section Two:

The Nature of Video Games

This section will summarize the unique features of games. Simply, these games are mass-market products consumed for entertainment. They can be regarded as 'experiential' goods as product consumption is the experience of playing the game (Holbrook and Hirschman 1982). For a full retail purchase price of £54.99, the player expects to play the game anywhere from 20-50 hours. A gamer may play alone, or may play in multi-player mode together with another 2 to 20 other players.[23]

What is it that draws players into video games? As Tschang suggests:

> simultaneously seeking either escapism or the experiencing of alternative realities, the challenges of problem solving, the thrill of competitive play … These may be accomplished by realistic or otherwise immersive content, emotionally compelling experiences (e.g., a narrative that draws in players) … which can be more visceral, and more involving of thought and action, on the part of the user. Game play modelled after real life actions can make the player believe he or she is interacting with the virtual world.
> (Tschang 2005:107).[24]

The choice of genre is the player's fundamental choice (of engagement) into which virtual world he would like to enter, be it the total involvement of driving a racing car around a world-renowned circuit at high speed, or the slower cerebral involvement of a strategy game replaying the Second World War. The design of video games is to stimulate ranges of emotions, which may run from the strong and primordial, to more subtle feelings of accomplishment and pleasure.

Games are complex technological products. The distinguishing feature with games, and other forms of popular entertainment, is the constant interaction – interactivity – between the player and game. That is, the player and his action and reaction keep him completely engaged during the game in an ever-changing manner. To put it in the everyday vernacular the game's task is to 'hook 'em and hold 'em.' More formally, the player is to be drawn into the 'flow' state of total engagement (Csikszentmihalyi 1991). Cowley and his colleagues (2008:20:11) have nicely captured these elements of game flow. They are:

[23] This excludes Massively Multiplayer Online Games (MMOG's) such as *World of Warcraft* that may have tens of thousands of players simultaneously engaged.
[24] I would encourage the reader to review examples of these games on the major publisher's websites: Microsoft (www.xbox.com/en-US/more/games.htm), Sony (www.uk.playstation.com/ps3), Nintendo (www.nintendo.co.uk), Electronics Arts (www.eagames.co.uk), and Activision (www.activision.com).

Flow Elements

- A challenging but traceable task to be completed
- One is fully immersed in the task, no other concerns intrude
- One feels fully in control
- One has complete freedom to concentrate on the task
- The task has clear unambiguous goals
- One receives immediate feedback on actions
- One become less conscious of the passage of time
- Sense of identity lessens, but is afterward reinforced

These elements of flow are to build the engagement between player and game. The task of moving the player into the flow state is by the provision of 'fun.' The concept of fun is notoriously difficult to define and deliver in a game, and differs from culture to culture, market to market, and genre to genre (Chatfield 2010). The fun is expressed in the industry as 'good gameplay' by providing a '*linear progression through a designed sequence of content*' (Italics in original) (Tschang 2005:111). The path the player must navigate can be linear or branching for a storyline. One of many alternatives to provide this sequenced linear progression is by a 'sandbox' in which the player just 'plays around for fun' in a constrained environment. Many games, particularly of the action genre, are designed around a set of mechanics, that is, specific methods of engagement within the game. A very simplified example is the controls of a racing car (the mechanics) that enables the player to move the car around the racing circuit. Most games are designed around a progression of levels (or tasks), whereby a player competes one level and then progresses to the next level to master the tasks in that subsequent level. In the racing car example, it would be a series of circuits, for example, which might include all the F1 racing tracks in the world. It is the mission of those developing the game to ensure that the designed sequence of content is engaging, or like a young child, players will just throw the toy out of the pram.

Games are a complex combination of game design, artistic content, and technology (Cohendet and Simon 2007, Tschang 2005) which are integrated into a seamless atmosphere and suspension of reality. Game design forms gameplay, the essence of engagement and interactivity. Technology is the enabler that provides the tools for the designers and artists, such as in a racing game providing enhanced artificial intelligence for competing cars to simulate a more realistic behaviour and real-life experience. Artistic content provides both the action elements (as design), which the player controls, and the environment, into which the player suspends judgement of reality (as artwork). The player becomes immersed in the environment: e.g., the sleek cars for players to control and the reality of the racetrack. Technology further supports both content (game design and artwork) and gameplay by enabling the player's continued interaction, and developing the continuing complete new game state (new animation, progressed storyline, and new environment). Tschang (2005) summarizes this continued interaction (interactivity) as 'feedback.'

The provision of fun, interactivity, and flow are inextricably entwined in gameplay. Objects on the screen create the illusion that the player is in the game environment: for example controlling the movement around the racing circuit creates the illusion of actually being on the track. This is only a perception as on-screen the car is fixed and the track is moving to create the racing illusion. Interactivity may also involve elements of problem solving as in a strategy game, or elimination of enemy targets in a shooter, or moving around an environment in a role-playing game. The game must be set within the appropriate context of suspension of belief for that particular genre. As Sid Meier, a recognized industry game designer suggested, there is an '"unholy alliance" of designer and player, in which the player must 'suspend disbelief and the designer must satisfy the player's expectations' (Edge 2010:14). This means that the rules constraining any particular genre must be both appropriate and within the expected anticipations of the player. The artistic aesthetic, the overall art content as style and fidelity, should also be to the standards appropriate to that genre as set by the current expectations of the market.

Achieving the synthesis of interactivity and engagement for an extensive period of time (20-50 hours) is not an easy task. One of the principle challenges is the 'inherently general air of unpredictability about consumers' responses' (Tschang 2005:112). In the design and planning phase, the designers anticipate the players' responses. As soon as feasible, early prototypes are developed to test the effectiveness of the design ideas in practice. Again, as soon as possible, play-test versions are exposed to test panels to gain further feedback on anticipated gameplay. One aspect of current game development is constantly seeking multiple forms of user feedback to test whether the 'fun' objectives are being accomplished. It becomes a constant iterative feedback loop to ensure that the game meets the target audience's concept of fun (encompassing engagement, interactivity, and flow), and to ensure that the developers do not get too close to their own game and lose perspective. The unpredictability of capturing and holding the player's attention extends to the moment the game goes to market.

The greatest challenge is the delivery of a playable design, artistic aesthetic, and technology, all in a cohesive and engaging manner. The game must provide on all three aspects: the game design must be new and refreshing, the artistic content must meet an increasingly higher market standard, and the fast-moving and increasingly sophisticated technology must provide the structural support. Tschang summarized the difficulty of producing games as an 'extreme requirement':

> Even the process of taking a video game properly specified on paper and properly implementing it as an engaging interactive experience is a daunting task that most video game development studios flounder with, due to the number of subtle issues that can make the "experience" go wrong. (Tschang 2005:113)

Achieving these challenges is extremely hard and not often accomplished. The concluding section of this chapter will discuss the risks involved.

The chapter opened by outlining the overall nature of the games industry. The distinguishing features of games as experiential goods were then outlined. The chapter addresses how games are evaluated, which has significant implications on understanding quality and creativity. The chapter closes with a relatively detailed summary of game development process to lay the foundations and reference and analysis developed in later chapters.

Section Three:

The Judgement of Creativity and Quality

The hard-core gamer becomes aware of new titles primarily from advertising, pre-reviews, and reviews in specialist magazines and on-line game sites. After release, the games are reviewed and scored with a rating to act as a buying guide. A number of on-line sites then aggregate these ratings and publish overall 'quality scores.' A very popular and highly rated consumer entertainment-rating site is www.metacritic.com[25], which rates movies, DVDs, TV, music, and games. The site has considerable influence on consumer purchasing decisions. As the site's mission statement declares, its task is to help the consumer 'make an informed decision about how to spend your money on entertainment.' The site and the game ratings and ranking have a significant influence in the game development community as it clearly determines what games (and why) are currently popular. A second well-regarded on-line site that reviews games and aggregates

[25] UK Guardian rated the site as one of the top 100 essential web sites http://www.guardian.co.uk/technology/2009/dec/09/best-websites-internet (downloaded 13 April, 2010), and Time Magazine rated as one of the top 50 websites. http://www.time.com/time/specials/packages/article/0,28804,1918031_1918016_1917954,00.html (downloaded 13 April, 2010)

review scores is www.gamerankings.com, although the same parent, CNET, owns both sites.

Metacritic.com rates individual games with a METASCORE, a weighed rating of approximately 150 highly regarded print and on-line publications.[26] Further comments as to the game's qualities are included from the individual aggregated sites to provide a fuller analysis of the game. The weighting assigns more significance to certain critics and publications based on Metacritic's considerations of the quality of their ratings and reviews. The individual games rate on a scale from 1-100 in the categories of:

Universal Acclaim	**90-100**
Generally Favourable Reviews	**75-89**
Mixed or Average Reviews	**50-74**
Generally Unfavourable Reviews	**20-49**
Overwhelming Dislike	**0-19**

Table 5 Metacritic Ratings Chart

The 100-point rating scale is both arbitrary and relative, which can only reflect the summary of social judgement at a particular time, and the perceptions of the reviewers as to the 'then' important attributes of current games.[27] It is not, and cannot be regarded as, an absolute standard. The value is that it reflects the wisdom of the crowd (Surowiecki 2005), or more formally an example of Amabile's 'Consensual Assessment Technique (CAT)' (Amabile 1982). The industry places considerable emphasis on the absolute numerical score as a proxy for quality.[28] Although many industry participants are well aware of the subjective nature of these ratings, they frankly say it is the best indicator

[26] Metacritic also shows players' numeric evaluations of a game, but these are largely ignored by the industry as they are open to manipulation.
[27] The underlying rankings are a summary judgment of all the elements of a game: i.e. game play, storyline, technology, art and graphics, including sound effects and music.
[28] The meaning of 'quality' will be further elaborated in this section.

available. As one observer mentioned, ‘Certainly, viewed broadly, the games at the top of the scale are generally the best games around, and the bottom ones certainly aren’t’ (Edge March 2009). Publishers have found there is a strong, but not perfect, relationship between these rankings and a game’s sales (a topic developed further in the section).

For the large and expensive games referred to earlier in this chapter, publishers place great emphasis on achieving the highest Metacritic scores possible. Some games are developed with explicit objectives to achieve targeted scores within certain time and budget constraints. The ratings are used as bonus incentives for publishers’ internal and external development teams, providing a reward for ‘quality’ achievement in game production.[29] Publishers use these ratings for a number of other purposes, such as the aggregate of all their games as a measure of their overall company quality and/or how they are going to improve their quality in the future.[30] Companies will use the ranking to help define the culture of the company as ‘we strive to achieve 80+ games,’ as stated by one organization contacted in the research.

At a recent industry conference, Activision presented results of a study conducted on the correlation between sales and game rankings. Their conclusions were that sales for higher rated games achieved an average doubling in units sold for every five points above 80 points. However, some publishers reported that the greatest sales growth tended to occur in the region of 70 points as opposed to those games scoring above 80 points (Edge March 2009). In the same article, reporting Activision’s findings, Marc Doyle, Metacritic co-founder and Games Editor, stated that a number of other publisher studies found certain types of games and genres where the sales/rankings correlation between the

[29] Economic awards to the various other stakeholder groups are derived from sales levels.
[30] Electronic Arts securities industry presentation on 10 March 2010. http://investors.ea.com/events.cfm (downloaded 13 April 2010)

Metacritic score was much stronger, such as racing, sports, certain types of action games, and certain types of franchises. Activision's Chief Executive Officer has gone further and stated that 'game scores, among other factors, can actually influence sales, not just reflect their quality'.[31] In a recent UK based survey, 71% of players felt that game reviews were extremely important when considering the purchase of a new game.[32]

The ratings are not without their critics primarily because of the perceived 'subjective nature' of all reviews. It is especially true of those developers receiving, in their view, inappropriate scores on the basis that the reviewers 'did not understand what we were doing.' Chief among these criticisms are the following: reviews are not international, reviewers are not qualified for that particular genre, review publications are subject to advertising influences, reviewers are highly influenced by other reviews, and using weighted measures is incorrect and inappropriate.[33] [34] Certain genres such as children's and family games have not shown to have a significant correlation between review rating and sales. In part, this may be because many of the reviewers are more interested in hard-core games and are without the expertise (or interest) to evaluate these other game genres. For these children's and family games, the relationship with sales has proved tenuous, as purchasers of these genres will not read either the reviews or Metacritic.com.

However reluctantly accepted by the industry, there are a number of observations that are relevant in understanding the Metacritic scores. First, they are a reflection of the past and current public's taste. They may not necessarily reflect future responses in two or three

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[31] Wall Street Journal article http://online.wsj.com/public/article/SB119024844874433247-EnpxM1F6fI9YZDofC7VnyPzVrGQ_20070920.html (downloaded 21 April 2010)

[32] http://www.industrygamers.com/news/game-reviews-not-price-key-to-purchasing-decisions-finds-survey/ (downloaded 17 May 2010)

[33] Interview 12 May 2010 with Mark Cale, President System 3, a game publisher.

[34] Further examples of industry criticism can be found in the 17 March 2010 commentary at www.clockworkmanual.com (downloaded 3 May 2010)

years' time when a game under development is finally published. Second, some publishers in developing a title with a well-known franchise (i.e., the Ice Age film franchise) will target a specific score – for instance 70-75 (average rating). The decision is made in the knowledge that the franchise will carry the sales and the Metacritic rating will not influence the sales. Thus, additional investment required to push to a higher rating is not justified. The aspect of a targeted quality rating will be further discussed in the Chapter Five model discussions and the Creative Continuum.

The game ranking sites are 'gatekeepers' to the industry and hence as a result of their endorsement certain 'in vogue' game qualities and features achieve higher ratings (Caves 2000). Subsequently, publishers will include these qualities and features to the higher Metacritic scores, in forthcoming games in an attempt to maximize revenues. In one sense, the reviewers can be seen as propelling the industry forward (Sternberg 1999). Buyers for the retail organizations will only purchase for distribution those games that have a high Metacritic rating, thereby further reinforcing certain features that are considered market requirements. On the other hand, qualities and features that the gatekeepers do not endorse will not be included in future games. These review sites then open and close the gate to new game qualities and features.[35]

To return to a point mentioned earlier, that is, do rankings have an influence on game sales and what does that have to do with creativity? The following section will start to answer these questions.

[35] This theme is further developed in the following chapter, and agrees with the theoretical systems work of Mihaly Csikszentmihályi (1988, 1999).

Statistical analysis of Metacritic ratings and sales

To test the industry comments on the relationship between Metacritic ratings and game sales, an independent statistical test was conducted. I requested Dr. John Fenlon, University of Warwick Department of Statistics, to provide independent expert opinion on my hypothesis. The analysis tested the life-to-date sales of the three major game platforms during 2009. Even though the data did not cover the full console cycle, the results were clear. The coefficients of correlations for Metacritic ratings and sales for the three platforms were found to be as follows:

Xbox 360	.661
Sony PS3	.640
Wii	.309

As a group, the figures show the necessary high correlation. Even the significantly lower Wii result is 'highly significant' with 'a change of such a configuration being thrown up at random in excess of 1 in 1000!'[36] Presumably, the lower Wii score is related to it being in a different market segment compared to the hard-core Xbox 360 and PS3 users. This was reflected in my own field research. Organizations that were significantly influenced by the Metacritic rating developed exclusively Xbox 360 and Sony PS3 titles. A more detailed analysis with graphs is in Appendix A.

Taking the Next Step

What does the positive correlation between sales and ratings mean? As mentioned above, there were exceptions in some specific genres (e.g., children's and family games, and existing franchises), and Metacritic is not without its critics. Whatever the criticisms, it was clear from the field interviews for organizations producing Xbox 360 and PS3 games that achieving a high Metacritic score was a major objective of the development teams as a measure of quality. The teams were striving not only to achieve a high score in absolute

[36] Dr. John Fenlon, Appendix A.

terms but also to beat their competitors' scores. They also assumed (with some justification) that this higher score would translate into higher sales.

In exploring the complexities of the research topic, one of the main concerns of the thesis has been to develop a rigorous and field-appropriate creativity definition. As will be further explored in the following Chapter Four (Literature Review), a key component of the creativity definition developed is that in must 'add value' – that is, a creative product must add value to a game's developer, in this case the game publisher. The importance of the Metacritic rating as a measure of quality of Xbox and PS3 games is the positive relationship between quality (Metacritic rating) and sales. Thus, a Metacritic rating, as a measure of quality, can be used as a proxy for sales, as a measure of 'value.'

The other component of defining the result of the creative process (alongside 'add value) is that some portion of a game's qualities and features must be 'new.' Again, this aspect of the definition is further developed in Chapters Five (The Creative Process Models) and Seven (Discussion and Implications). However, a separate factor, which needs to be distinguished from creativity, relates to enhancements that only increase the 'production values.' These might include improvements in art, sound, music, special effects, or smoother gameplay. These improvements are context specific. For example, on-screen artwork for a warrior figure is composed of thousands of individual polygons. If a warrior is enhanced from 5,000 polygons to 15,000 polygons,[37] it will look significantly sharper, be brighter, and show more detail. The figure will be judged with its finer detail to be of a 'higher standard' of production values. However, it will not meet the requirement of higher creativity. A re-made title with only increased production values should not achieve any significant Metacritic rating as there will be nothing 'new' or 'added value'

[37] A polygon is a small unit of computer graphics display code.

in the sense of more entertaining (fun, interactivity, or flow). The entertainment value will be the same as in the previous version. Within the framework of this thesis, higher standards in terms of production values are not equivalent to higher creativity.[38] The focus should not be on incremental improvements in production values (to higher standards), but should be on more fundamental characteristics which are 'new' and 'add value' to a game.

To meet market demands publishers will increase both the creative features (new attributes) of a game and its production values (standards) and it is important to differentiate between the two. It is not to say that there are no rating influences from improving production values, but it should logically have no impact on overall product creative ratings. In practice, of course, it is bound to have some influence on reviewers who, after all, do bring all their human foibles to work and will always like something that looks pretty! A more beautiful game will have some influence, and yet a publisher cannot ultimately compete on increasing production values (standards) alone. In terms of production values, the market's standards are constantly increasing – the production values of this year's games are significantly higher than those last year, or two years ago.

We can say a higher Metascore can be a proxy for judging the quality, and thus success of a title, but we cannot say that it is the only reason for sales success. Other significant influences such as appropriate marketing and distribution influence sales success. The statistics above show a strong correlation between ratings and sales success, but there are always certain glaring exceptions, such as why certain titles have extraordinary sales with low ratings, and why other titles have high ratings and yet low sales. In the end, 'value' is

[38] Of course, there are contexts in which increased quality has great value. For example, luxury goods, so the maximization of production standards alone must be judged within context.

relative to objectives (or 'fitness of purpose'), and thus creativity is depends on context. A possible explanation for these exceptions is proposed in Chapter Five (The Creativity Process Models) where the Creative Continuum is presented and implications discussed.

The chapter has discussed the 'where' (the industry), the 'what' (the nature), the 'who' (the reviewers), and will now address the 'how' of game development. This is followed in the concluding chapter section by considering the 'why' (the P&L).

Section Four:

An Outline of the Game Development Process

A publisher authorizes a game for production to provide a future revenue stream and profits. The games are developed to enter a new franchise for corporate strategic reasons, or to continue an existing franchise. Perhaps an internal product champion (or studio) proposes a new intellectual property (IP) for a game that may, if successful, mature into a long-term franchise. These games are both expensive and risky, and in response, publishers have developed formal production control processes. These processes are bounded by formal constraints of time and budget, and the less well defined, but none-the-less critical, creative aspects.[39] Throughout the industry, a 'stage-gated process' has become the standard procedure, although the rigors with which this is applied varies from publisher to publisher.

In a stage-gated process, there are formal approval 'gates' at which point the project must obtain formal approvals before moving on to the next stage. There are three major stages in the production of a game. First, there is the Pre-Production during which formal

[39] This example of the formal production process is based on the confidential internal development documents of one of the organizations in the research. It is a more traditional industry method as opposed to a major alternative, knows as 'agile development' that is highly iterative.

planning is completed for the entire development. Next is the Production in which assets (art and programming code) of the game are produced. The third is Post-Production where any remaining creative problems are resolved – the game undergoes final polishing, and all bugs (errors) are eliminated. As a rough guideline, the development timetable is in the order of 12-24 months for a sequel game, and up to 36-plus months for a new IP, which includes developing new technology.

In the stage-gate process, there is a hierarchy of approvals required before the project can move on to the next stage. For major gates including project-funding approval, or at the end of each major production stage, multiple levels of approval are required, including that of senior executive leadership, and even referring decisions up to the Company Board level. For phases within the stages, sub-level approvals are required such as a Steering Committee or Project Board. At a lower operating level, the Project Management Team has its own series of gates, which are presented to the Steering Committee or Project Board for approval. In this way, the formal control of the project is achieved. Development will not proceed to the next stage until the required hierarchical level of approval for that stage is obtained. Projects that are not meeting the necessary gate approvals, and where there is no anticipated recovery, are subject to being cancelled. There are many reasons why cancellations happen. The primary causes whether singularly or collectively are; a) large unanticipated cost overruns, or b) the game is not meeting the necessary fun and entertainment factors, or c) the technical requirements cannot be achieved. Additionally, games are cancelled for competitive reasons, for example, they are not meeting market requirements, or a competitive product has come onto the market and the current product can no longer recover its investment. Project cancelations of these large expensive games will severely damage the profitability of the publisher.

A typical game development would follow a process similar to the following.

Concept Phase

Most often, the concept phase is an informal stage where the outline of the project is developed within a small group of individuals concentrating on the essential design outlines, technical requirements, and budgets for the game. As these parameters are established, additional individuals in specialist functional roles become part of the team. For example, a core team of between five and ten individuals (senior producers and designers), will be augmented by functional specialists (artists and programmers) to develop the concept further with visual examples of art and elementary programming. In this stage, the overall concept or vision of the game is developed.

The critical tasks of Pre-Production are to establish the major parameters of the game. Exactly what is the game, what is the brand positioning, and can the game be successful in the market? Can the game be produced on time and on budget? What are the technical challenges, and how will they be overcome? Will the game meet the organization’s profit requirements? The more planning that is accomplished at this stage, the lower the risks should be during production.

When the phase is completed, the more formal process will start.

Pre-Production	
Pre-production Phase 1	**Game concept including:** • initial brand plan **Risk Assessment including:** • strategy to address major risks • initial financials
Pre-production Phase 2	**Prototype and game design sufficiently complete:** • technical-proved scope approved • quality standards approved for, - visual - audio - gameplay - technical standard • production work estimated
Pre-production Phase 3	**Product specification** • key areas of design approved • production specifications finalized **Plans:** • Project Plan complete • Brand, Marketing, Business Plans complete • final ROI (Return On Investment) complete

Table 6 Pre-Production Phases

Another major task in Pre-Production is to develop an on-screen representation of the game to visualize gameplay. It can be regarded as a 'proof of concept' or prototype to assist the team to bring to life their vision. Will the game be fun? Will the game capture the player's interest for 20-50 hours of gameplay? Are technical challenges being determined and can they be met? To the fullest extent possible what is on-screen will be representative of the final game. It assists the development team in further refining their vision and showing that it can be accomplished, and thus gain the organization's approval of that vision. An important point in the development of the prototype is not necessarily to develop assets or code that will be used in later production. What is produced is often discarded entirely or in part. The objective is to put on screen a representation of the full production and to gather as much information as possible for the next production stage.

The Pre-Production prototype could be considered the first iteration of the game. One of the major needs at any stage of production is to get examples of every element of the game up on the screen as soon as possible. This step is intended to both to meet scheduling requirements, and to see how the gameplay elements are coming together.

At this point, the first stage is complete. Following the major gate, the title is approved for production to start. In a term borrowed from the film industry, the game is now 'green light' for production. Now the major expenses of development start to accumulate.

Production

Production is monitored by a series of milestones that are typically between one and three months long. These gated milestones are usually numbered; Production Milestone 1, Production Milestone 2, Production Milestone 3, etc., and this continue until production is complete. The objectives of each milestone are to:

- monitor against production and budget plans
- assess ability to meet future milestones
- review against quality targets
- approve any required changes

The task of the stage is to build the assets required. An analogy from outside software production is that the 'bill of materials' which are being built and assembled. As is shown later, most of the development time and costs occur during the production stage. The critical aspects of the stage are to monitor the production of the game assets and ensure that they are delivered on time, on budget and to the appropriate production standard levels.

Again as in Pre-Production, prototypes are needed to monitor how the game is progressing on-screen and to bring to light any unforeseen problems. In many development schedules, a major prototype is constructed very early, known as a 'vertical slice.' This is an example of the game from top to bottom demonstrating all significant features, and may include a complete section or level.

Post-Production

When the final production milestone has been completed, the title has then met a major milestone. This is Alpha, where all of the content of the game has been produced.[40] The game is playable from start to finish, will crash often and will contain a large quantity of bugs. The game is not yet ready for commercial shipment. The critical aspects are:

- all features complete
- main game path is playable
- all game features are playable

It is a key milestone. Confidence is being built that the game can ship, however much work remains. The next major stage-gate is Beta, where all production, tuning, and design changes are, or should be, complete. Now only fixing 'bugs' remains until the game is designated as ready to ship. The critical aspects are:

- content complete [41]
- bug count is within reasonable parameters
- confidence that the game can ship on schedule

[40] At least in theory, as in practice there are always certain elements or features of the title requiring some further work. These are treated as exceptions and monitored closely.

[41] As game software is malleable in that changes are able to be made until the last moment and because this is, the first time the game can be fully played all the way through, creative decisions can and continue to be made during the Beta production stage.

At the completion of this stage, the publisher believes the game is ready to ship and submits the game to the hardware console manufacturer (Microsoft, Sony, or Nintendo) for final certification. The approval is to ensure the game meets technical standards for their hardware, quality standards (inappropriate cultural references), and that there are no bugs. The hardware manufacturers do not approve or disapprove the gameplay quality of the game. That responsibility lies with the publisher. The critical aspects of submission are:

- all bugs eliminated
- technical standards met
- certified for manufacturing

After the console manufacturer approves the game it goes to manufacturing and then ships into the marketplace.

A point to emphasise again is that at any stage in the production process, creative decisions can be made that modify any game aspect. These adjustments may be minor with implications that there has been excellent planning from Pre-Production stage. Alternatively, the changes may be major, as the production is not meeting the fun and engaging objectives. Perhaps the game can be significantly improved and enhanced because of what the team can now see on screen. However, in one way or another, every change from the Pre-Production plans will affect the budget and schedule.

This outline brings into focus game development as a series of decisions made from both a vertical perspective and horizontal perspective. The vertical perspective is where the publishers' hierarchy must give the necessary approvals for the game to move forward in production. The decision includes agreement both that the current stage-gate has been accomplished, and that the development team has ability to accomplish the next stage. From the horizontal perspective, the approval is achieved for the execution of prior content decisions, and for the decisions as to what content will be included in the next stage.[42] Thus, game development is an on-going stream of decisions, at all levels of detail: e.g., design, art, or technology from the highest conceptual level to the smallest detail on-screen (Krishnan and Ulrich 2001).

The game development process highlights two important concepts. First, the decision process, conceptualized as, 'which ideas to choose to implement', is an integral part of the creating process. I discuss further in Chapter Five (The Creating Process), in which a model is proposed that incorporates the decision process as a fundamental element in the creative process. Secondly, as mentioned above, the creating process occurs throughout the development process. As Tschang expressed it: **'This suggests that a more continuous form of creativity rather than just a flash of insight is the underlying cause of an innovative game.'** (original in bold) (Tschang 2003b:19).

The following section will consider the development teams and conclude with the economic models that constrain game development.

<u>The Production Team</u>

The section outlines the labour requirements needed to develop a game on the Xbox 360 and PS3 platforms, and explains how it translates into a budget.[43] The schedule (Table 5) has the production stages across the top of the table. The production functions and team members are down the left hand column. The total monthly labour requirements are summarized across the bottom. With an average full development burdened monthly

[42] Of course, organizational dynamics are more complex. Senior leaders or marketing may insist that their ideas be included in the game. These decisions may or may not be appropriate.
[43] The manpower schedule was examined by a number of senior industry executives and accepted as portraying a reasonable representative sample of the requirements for 'an average action-adventure'

labour cost of £10,000[44] and 1,400 labour months, the example has a total cost of £14,000,000. As will be further developed in the following section, with the addition of variable costs, such as advertising, the total cost figure for a game substantially increases to a total of approximately £18,000,000.

The following chart shows the build-up in labour as the game production progresses from a small concept team average of 16 individuals per month, into the Pre-Production stage averaging 26 individuals per month, and then into the Production stage averaging 74 individuals per month rising to a peak of 83 individuals per month. The team then tapers down in the Alpha-to-Final stage to around 34 individuals as the game comes to completion. There are three core groups comprising technology (programming), content (essentially art), and the design teams. The individuals in each of these groups are specialists within their field, but these interdependent groups must work together concurrently as a larger team to deliver the game.

[44] This is an estimated UK industry figure and will vary from publisher to publisher. Fully burdened includes all costs, including direct support costs and all governmental social costs.

Video Game Development Manpower Chart[45]

Outline model of Action/Adventure game				New Intellectual Property		Development engine available					Platforms PS3 & Xbox 360		
15-Aug-11	Quarterly	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Total		
		Concept	Pre-Production		Production				Alpha	Beta/Final			
Producers													
	Ex Producer	3	3	3	3	3	3	3	3	3	27		
	Producers	9	9	9	9	9	9	9	9	9	81		
												108	8%
Game Design													
	Chief Game Designer	3	3	3	3	3	3	3	3	3	27		
	Game designers	4	6	6	6	6	6	6	6	6	52		
	Level/Mission Designers		8	12	18	18	18	18	18	18	128		
												207	15%
Art													
	Art Director	3	3	3	3	3	3	3	3	3	27		
	Art Manager	3	3	3	3	3	3	3	3	3	27		
	Art Leads	6	9	9	9	9	9	9	9	9	78		
	Artists	3	9	9	59	78	90	90	35	15	388		
												520	37%
Technology													
	Tech Manager	2	3	3	3	3	3	3	3	3	26		
	Tech Leads	4	9	9	9	9	9	9	9	9	76		
	Programmers	2	6	9	40	51	56	57	29	15	265		
												367	26%
Audio													
	Fx				6	6	6	6	4		28		
	Music				3	3	3	3	2		14		
												42	3%
Testers													
	Equivalents				6	6	9	21	30	30	102		
Brand												102	7%
	Manager	3	3	3	3	3	3	3	3	3	27		
	Brand	3	3	3	3	3	3	3	3	3	27		
												54	4%
		48	77	84	186	216	236	249	172	132	1400	1400	100%

Total £ Cost	£14,000,000
Monthly £ Rate	£10,000
Average labour monthly rate	

Functional cost by time period		
Concept	48	4%
Pre-Production	161	12%
Production	968	69%
Final	223	16%
	1400	100%

Table 7 Video Game Manpower Development Chart

The chart shows there are significantly different costs associated with each of the stages:

Concept	4%
Pre-Production	11%
Production	70%
Post-Production	15%
Total	100%

[45] The chart is in a standard industry format. The man-month content is generic but accurately represents industry norms. It was developed in consultation with knowledgeable industry executives and reviewed by three senior managers in the studied development studios.

With the breakdown by function:

Producers	8%
Game Design	15%
Art	37%
Technology	27%
Audio	3%
Testers	7%
Brand	3%
	100%

The latter table shows the Game Design individuals with responsibility for the creative aspects are a relatively small 15% of the total labour requirement. In this core creative group is the Chief Game Designer, the game visionary. While it is not necessarily true that he and his group develop all creative ideas for the game, the game design team does have ultimate responsibility for their approval: i.e., the decision of what to implement in the game. The chart shows that the Game Design function in the Concept and Pre-Production stages is again a small 15% (Concept 4%, Pre-Production 11%). It shows the 'creative costs' are a significant but smaller portion of total development costs. In other words, the 'creative costs' are highly leveraged in proportion to the total game costs.[46] It does not diminish the contribution of the Art and Technology groups, who certainly do make creative contributions (as they define what creative contributions are), but these groups are in essence instructed what to build by decisions made in the Concept and Pre-Production stages, and by the Design Group. The asset production costs are the largest. From the functional perspective, these are 67% (Art 37%, Technology 27%, and Audio 3%) or from the Production stage perspective at 70%. It is the obverse of the leverage from the formal Game Design team's contribution.

[46] The subject of if, when, and how to maximize (i.e., manage) creative individuals in the development team in not addressed in this thesis. This is a very complex and little understood area of research. The excellent work of Paul B. Paulus (Paulus 2000, Paulus and Brown 2007) on group creativity is illustrative.

Although varying from project to project, and publisher to publisher, the usual management configuration is that the major function heads; producers, game design, art, and technology report to a studio head.[47] It is the management team that is responsible for delivery of the game – fun, engaging, on time, and on budget. In the thesis, I will be referring to these individuals as the 'managers,' with those in the echelons above them in the organizational hierarchy as 'leaders' or 'executives.' In this way, I intend to distinguish between the responsibilities of two distinct organizational levels.

In contrast to the film industry, in which individuals join the production as and when needed (DeFillippi and Arthur 1998), in game development the team is employed full time.[48] The primary reasons are to retain critical highly skilled talent, and it takes a number of years to build highly effective teams. One prominent industry participant believes that it takes three full productions to build a performance team (Gaume 2006). Another significant problem common to all production organizations is to have the right individuals available for the right task at the right time. A key individual or individuals on one production may not be suitable for the same key role on the following production. The labour schedule also shows how the team size expands and contracts during the production cycle. As all individuals are full time employees, what do they do when not needed on a specific production? Managing the line-balancing problem is a major management task both from the personal aspects and from a production efficiency perspective. Organizations manage the variable workload in numerous ways none of these are perfect. Much depends on the size of the organization, with smaller organizations having the most difficulty. Larger organizations have more flexibility in being able to move more individuals around from team to team. Without successful

[47] This was the structure of the interviewed organizations.
[48] Some less complex production elements may be placed with outside production organizations. This is both to handle peak production loads and to reduce cost by placing with lower cost organizations. This is particularly true of 'standard' art production.

resolution, significant additional costs may have to be absorbed in the game profit and loss statement (P&L).

In the concluding section, the absolute constraint of the P&L is covered, with an emphasis on the project risk profile.

Section Five:

> *You can't sell a BAFTA to pay your wages, so if your P&L doesn't make sense, you cut something.* Senior Executive (15:15)

The Economic Models

> In organizational settings, value tends to have a "bottom line" quality to it – at some point the magnitude, duration, and scope of the novel idea's economic contribution must be articulated. This is not a trivial task. (Ford and Sullivan 2005:245)

The importance of developing the project P&L could not be better expressed than in the above quotation. The ultimate constraint on the publishers is the profitability of the games they publish. Unless they make a sustained profit stream from the aggregate of all games published, they will cease to exist. Based on the development labour chart discussed above, set out below is an example of the profit and loss statement for a game. There are multiple methods of showing financial data. The method chosen emphasizes the number of units the publisher must sell in order to reach a breakeven point. It is important to note that the required profitability point is higher than a game's breakeven point. It will depend on the publisher's overhead cost structure and profit requirements, and can be anywhere in the 25-50% range in addition to the direct costs in the analysis. No profit-motivated organization can survive by only operating at breakeven point.

The example has an estimated cost of £14,000,000 based on approximately 1,400 man-months of labour as set out in the previous section. The left hand side of the schedule shows the 'Variable Cost' assumptions. Variable costs are either standard industry practice, or fixed per unit costs from either Sony or Microsoft. The critical publisher decisions– the 'Investment Cost' decisions – are how much to invest in the development of the title and how much to spend on marketing. These are both substantial sums. The publisher will decide the levels of these two investment decisions based on the forecast of the unit sales of the title. The 'average' title entailed a total investment of approximately £17,670,961. Larger, higher profile, AAA (triple A) titles will invest substantially more.[49] In the example, the right hand schedule details the unit cost elements to a per unit marginal profit breakeven point. In the example, it will require the sale of 794,725 copies for the publisher to recover the direct costs, with the additional uplift of 25-50% units to meet required profitability requirements. For a fully burdened game[50] at the corporate level, it will be between approximately 900,000 and 1,200,000 units. One senior interviewee indicated that his rule of thumb was that for a £12,500,000 ($20,000,000) title he needed to sell 1,000,000 units worldwide.

Publishing games is a very risky business. As mentioned earlier, in 2009 for the US, only 32 or 0.7% of all titles achieved sales in excess of 1,000,000 units. In 2009, the average lifetime sales in the US market for games on the Xbox 360 were 281,000 units, for the PS3 it was 188,000 units, with a total for both platforms of 469,000 units. While the US

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[49] The LA times in November 18, 2009 reported that Call of Duty [Modern Warfare 2] 'cost $40 million to $50 million to produce, people close to the project said, about as much as a mid-size film. Including marketing expenses and the cost of producing and distributing discs, the launch budget was $200 million, on par with a summer popcorn movie -- and extremely high for a video game.' http://articles.latimes.com/2009/nov/18/business/fi-ct-duty18 (accessed 23 September 2011).

[50] That is including all direct and indirect costs.

PS3-Xbox 360 Breakeven Model

Scenario Assumptions

Variable Costs:	
Retail Margin	30 % of retail
Returns/Price Protection Reserve	10 % of wholesale
Manufacturer's Royalty	12 % of retail
Manufacturing Unit Cost	£3.50
Co-op/Trade Marketing	3 % of wholesale
--Distribution Fees	3 % of wholesale
VAT	15 % of wholesale
Investment Decisions:	
Maximum Marketing Budget	12 % of wholesale
Minimum Marketing Budget	£1,000,000,00
Development Budget	**£14,000,000,00**

Model Details

Retail Price	£	54.99
VAT	£	8.25
Retail Margin	£	16.50
Wholesale Price	**£**	**16.50**
Returns/Price Reserve	£	3.85
Net Wholesale	**£**	**34.64**
Cost of Goods		
Manufacturing Cost	£	3.50
Manufacturer's Royalty	£	6.60
Total Cost of Goods	**£**	**10.10**
		18.4 %
Gross Margin	**£**	**24.54**
		44.6 %
Other Variable Costs		
Co-op/Trade Marketing	£	1.15
Distribution Fees	£	1.15
Marginal Profit	**£**	**22.24**
		40.4 %
Marketing & Development Costs		
Product Development	£	14,000,000
Marketing Spend	£	3,670,961
Total Fixed Costs	**£**	17,670,961
Units to Breakeven		794,725

Table 8 PS3-Xbox 360 Breakeven Model

market is estimated to be 60% of the total worldwide market; most titles do not recover their fully burdened and necessary profitability requirements.[51] There is a common recognition in the industry that it is a 'hits driven business;' that is, a few very successful

[51] Unit sales figures and US proportion of worldwide unit sales provide by the International Development Group, San Francisco.

titles provide the profits for the publishers and carry the losses for the majority of unsuccessful titles.

Publishers do have some ancillary revenues streams, such as licensing to different media (e.g., the Lara Croft character to film), or in-game product advertising or product placement, and very recently the production of downloadable content (DLC). As these are variable and situationally unique, they do not provide sufficient revenues to sustain the publishers.

Thus, from an overall industry perspective and the constraints of the P&L, it is clearly a highly competitive industry with a high risks for the participants.

Section Six:

Recognizing the Risks

A full and detailed analysis of all the risks facing game development is beyond the scope of this thesis, so the concluding chapter section contains only a brief summary to emphasize the risks involved. There are two main categories of risk. The first is internal: is the game fun, engaging, and will the game be completed on time and on budget? Second, is external risk: will the game be market competitive and meet profit requirements? These categories are not mutually exclusive. For example, how well the game is developed will affect how many units are sold.

From an external viewpoint, some risks are:

- Will the game achieve the necessary sales for required for total corporate profitability?
- Will the game be developed on schedule and on budget?
- Will the product have the necessary features to be market competitive?
- Will consumers' tastes change during development?
- Will competition during the development period change the market?
- Will the market size and the genre size be as forecast?
- Will technology influence the market (e.g., relating to the continued impact of the internet on all aspects of the business?)
- Will there be other technological market risks?
- Will the marketing efforts in quantity and quality be effective?

Unfortunately, the list could be endless with known problems. This is without considering unknown problems that inevitably occur in any dynamic environment, long-tailed probability events, or Black Swans in the current popular imagination (Taleb 2007).

In game development, there are many reasons why games have problems and do not meet expectations. Petrillo and colleagues (Petrillo et al 2009) have articulated a long list of fifteen significant items. The most noteworthy problem was with the scope of the game. This refers to the risk of designing a game that was too large and complex for the time and budget available. It manifested itself in two ways. There were either additional features added during development – enhancing items that became visible as the game progressed (known as feature creep) or cuts in the game from original design to maintain cost/time constraints. Other main problems were incomplete design, scheduling problems, and technical problems.[52]

To the leaders and managers involved in game production, risk is anything but an intellectual exercise or abstract concept. It is both very real and very personal. If the

[52] Additional problems were: crunch time (death march), lack of documentation, communication problems, tools problems, test problems, team building, number of defects (bugs), loss of team members, and going over budget.

game fails both their employment and industry careers, are at risk. It is well recognized in the literature that making a 'risk free' zone will encourage creativity and the creative process (Amabile 1996, 2005, Csikszentmihalyi 1991), but it is extraordinarily difficult to achieve at these organizational levels. The stage-gate process discussed earlier is striving to have multiple check and approval points (decision points) to mitigate risk. Even with such monitoring systems, the failure rates are very high. At the manager level, failure can cost them their careers. At the very least, they will not see their creative ideas on-screen and played by 'everyone', and reap the rewards of a successful title. At the leadership level, repeated failure can cost the company its existence. Ford captured the spirit of risk-taking uncertainty in an organizational setting with the following quotation:

> "With creativity comes uncertainty. Whenever you have uncertainty, people feel uncomfortable and insecure. If [a creative decision] is not successful, the negative things that can happen to you are ten times greater than the positive things." (Ford and Gioia 2000:723)

SUMMARY

The chapter opened with the key tasks of the industry's leaders and managers in game development and closed with the discussion of the risks involved with meeting these tasks. Apart from explaining the context of the video game industry, the unique features of video games, and the difficulty in their development, a consistent theme throughout the chapter has been how difficult the task is to accomplish. Awareness of these real world influences and constraints should always remain in the reader's awareness as the more interesting and positive aspects of the creative process become developed in later chapters.

The chapter developed the concept that Metacritic ratings could be used as a proxy for game quality, and with an independently conducted analysis showed there was a positive correlation between ratings and sales. The task of finding a field-appropriate definition of creativity and the creative process introduced the aspects of ‘new’ and ‘added value.’ A position taken by this thesis is that ‘production values’ are context specific, that when increased, are independent of increases of quality (as new and value added attributes). In the next chapter, the definition of creativity and the creative process is further developed.

CHAPTER FOUR

LITERATURE REVIEW

Introduction

The prior chapter has established the background of the research by outlining the nature of the video game industry, the features of large video games, their development process, and the economic constraints imposed by the financial models that set the boundaries for the publisher's decisions. Publishing these games assumes considerable financial risk to the publisher.

This chapter will position my research within the organizational creativity literature to anchor the core models developed in Chapter Five (The Creative Process Models). The first section of the chapter starts by reviewing the various definitions of creativity. I quote a number of examples to illustrate the range of interpretations to demonstrate the inherent problems in arriving at a workable definition for a research context. A working definition of creativity as used in the research is then articulated, drawing from these literature examples. The definition of the creative process then follows as the method by which creative products are developed. Each element of the definition is discussed, to provide additional clarity to the central concept. The creativity literature makes a distinction between creativity and innovation. I discuss the differences and clarify the position taken for the research.

Section Two is a short overview of the historical development of creativity research literature tracing the roots from early psychological studies into current organizational studies.

Section Three continues the historical overview laying the base for the development of the models used in the research. The first is Donald Campbell's (1960) Darwinian based BVSR (Blind-Variation-Selection-Retention) model. Following that is Dean Simonton's (1999a, 1999b, 2010a, 2010b) strong arguments supporting Campbell's framework. A further three models of organizational importance are discussed; first, Sternberg's Propulsion Model of Creative Contribution (1999) laying the foundations for the Creative Continuum. Secondly, Drazin, Glynn, and Kazanjian's (1999) sense-making model with its clear articulation of the time element and the shift in creative forces (in this case engineering versus management) during the dynamics of product development. Lastly, Csikszentmihályi's (1999) sociocultural systems model is introduced with his Person, Field, and Domain components of the creative process. His model both situates my research in the social context of the game industry and additionally provides support for the context of the models.

Section Four provides an overview of the limited creativity research in the video game industry. Most of the research in video game development is from the media studies tradition and not from a creative process and innovation perspective (Tschang 2006).

Section Five is a review and commentary of the models described in the prior two sections. Section Six is a critique of significant assumptions that have affected the development of the organizational creativity literature.

Section One:

The Problem in Defining Creativity

The term creativity is widely used throughout our society with a variety of meanings, differing from context to context: from the High Arts, to scientific research, to film making, and to business. The wide-ranging inexact conception has spilled over into the creative research literature, resulting in a very loose conceptual base with the lack of a commonly accepted definition. As Bilton (2007:xiv) expressed it ‘creativity has been devalued through over-use and emptied out of any real meaning.’ It is not only from a wider cultural perspective, but also within and among academic disciplines there is a lack of consensual agreement (O'Shea and Buckley 2007, Richards and deCook (in press)). Runco (2008) suggests that creativity used as a noun is inappropriate for use in any research. Compounding the problem is that in the specialist creativity research journals,[53] Plucker and Beghetto (Plucker, Beghetto and Dow 2004) report that only 38% of a sample of articles explicitly defined creativity which led to their conclusion, ‘We do not define what we mean when we study “Creativity” (:88).

This creates problems in both understanding the research articles, and in comparing various research results. Below I explore various examples of the creativity concept, closing with a working definition as used in my research. That is, a definition of the term creativity and the creative process will be used to describe the development of a specific type of product (i.e., very high cost games), by large teams (i.e., teams of 75-100+ people), in a specific kind of organization (i.e., major game publishers), in the current commercial environment. Above all, the definition needed to meet a requirement to be field relevant, such that the interviewees would find it understandable in their context.

[53] Creativity Research Journal and Journal of Creative Behavior

The prior chapter examined the nature of these products and organizations. Thus, the working definition grounded in the literature, is context specific with the intent both to remove possible ambiguities and to give clarity to the research findings. Consequently, the definition is not intended to apply to all contexts in which organizations use the creative process in developing creative products. I address the definitional problem in three parts: first a discussion of the general problem, followed by eight examples, which then lead into my working definition.

<u>The Problem Specifics</u>

The general understanding of creativity is coloured by the historical fascination with the High Arts of painting, literature, music, and drama. The Western cultural bias has focused on the genius of heroic individuals and the fruits of their efforts. To a minor extent, the labours of scientists are included within the general cultural understanding.

What is the problem?

> Creativity is an intensely subjective concept with which psychologists have grappled for over a hundred years as they have attempted to judge the creativity of individuals, products, ideas, and processes.' (West 1997:2)

With their emphasis on understanding the individual, psychologists have dominated the academic stream of creativity research. Despite the fact they were not clear as to exactly the subject they were studying. As one of the prominent quoted researchers summarized his thoughts:

> Creativity defies precise definition. This conclusion does not bother me at all. In fact, I am quite happy with it. Creativity is almost infinite…Therefore, even if we had a precise conception of creativity, I am certain we would have difficulty in putting it into words. (Torrance 1988:43)

As Parkhurst (1999) noted, the problem goes as far back as the 1960s and the start of significant academic research, when even then between 50-60 definitions were noted in the creativity literature. Since then, definitions have continued to proliferate into the hundreds as the creative literature has expanded. Numerous commentators over the years continue their observations on the unchanging situation (Plucker et al. 2004, Smith 2005, and Runco 2004a). Plucker et al express the confusion eloquently:

> We do not define what we mean when we study "creativity," which has resulted in a mythology … This is not merely a case of comparing apples and oranges: we believe that this lack of focus is tantamount to comparing apples, oranges, onions, and asparagus and calling them fruit. Even if you describe the onion very well, it is still not a fruit, and your description has little bearing on our efforts to describe the apple. (Plucker et al: 88-9)

The solution they suggest is to develop a definition of creativity that must be 'parsimonious, explicit, and empirically testable' (:87). The closer we come to meeting the requirement, the tighter the research findings should be. Any definition used in this research is subject to two parameters: First, I am taking the position that any working definition is context specific, and secondly, as these research findings are in the social domain, most findings are relative to another point of comparison, rather than absolute as in the Sciences. These are the 'softer' facts of the social sciences as opposed to the 'hard' facts of Science. The 'relative to another point of comparison' can be either a specific referent (i.e., another game), or the consensus of a knowledgeable group of individuals. One aspect of the definitional problem identified by Pucker et al is that researchers want to make the concept of creativity unitary (Unsworth 2001). Such an attempt to define a definition that is applicable to all creative endeavours regardless of domain, would give the impression of going in a different direction than proposed by Plucker. As mentioned above, my objective is a working definition that narrows ambiguity by being precise for definition, rather than seeking a unitary and universally applicable concept of creativity.

the context of the research.[54] I therefore follow Plucker's call for a 'parsimonious' definition, rather than seeking a unitary and universally applicable concept of creativity.

Definition Examples

Examined below are a number of examples from recent writings by leading researchers that illustrate the above comments. These examples are intended to demonstrate the wide range of definitions in the creativity research literature and the consequent difficulty in articulating a workable definition. The background will provide texture and framework to the working definition that I propose, grounded in the literature.

Example 1

A fine example of the confusion over definitions appears in a working report from the prestigious US National Science Foundation:

> Creativity involves the introduction of new variables, significant leaps, and novel connections. A subset of creativity, innovation involves the creation of a new idea but also involves its implementation, adoption and transfer. Innovation and discovery transform insight and technology into novel products, processes, and services that create value for stakeholders and society. Innovations and discoveries are the tangible outcomes. Creativity is needed to produce these outcomes. Innovation and discovery processes should be formal processes that harness creativity to those ends. (Schunn et al. 2006, p.8)

While the definition is intended for a more general audience, it seems to introduce too many variables, and tries to be all things to all people (the definition came from a joint working group across many disciplines). As is noted below, the position this research has taken is that innovation and creativity are the same process. A better definition would seem to move towards Plucker's tighter requirements. As will be seen from further examples, the above is a collection of independent and unspecified concepts.

[54] This does not preclude having a very unitary definition for general purposes (with general conclusions). I take the position that for research purposes, the definition must be context specific.

Example 2

Margaret Boden, a scholar in the field of computers and creativity expressed her thoughts thus:

> Creativity is the ability to generate ideas (structures, artefacts...) that are novel, surprising and valuable. Each of those three terms is ambiguous –hence the countless disagreements that occur in everyday, and even professional, discussions about creativity.
> (Boden 2009:179)

Of note is the leading phrase that creativity is an 'ability' to generate 'ideas' but the term of this definition have 'ambiguities.' Boden does recognize that ideas must have some unique attributes – that she identifies as "novel, surprising, and valuable." However, the core of the definition, based on 'ability', does not find support with other researchers, because it is person-centric. Furthermore, an 'ability' may or may not result in a finished product, which according to Csikszentmihályi is the only way creativity can be judged (Csikszentmihalyi 1999) – a position taken in this research.[55]

Examples 3 and 4

An early and continuingly influential scholar, Teresa Amabile, whose thoughts have significantly influenced the creativity literature definitions, suggested the following:

> A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created for the response articulated. Thus, creativity can be regarded as quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as a process by which something so judged is produced (Amabile 1996:33)

She is suggesting a significant shift in perspective where the central point has shifted to undefined qualities of the product (not an idea), that are 'independently' evaluated and judged. These qualities are socially determined, and therefore relative.

[55] Boden is a psychologist. Csikszentmihályi is a social psychologist. His observation is important in that ONLY when a product is complete can an evaluation be made. Ideas per se are only able to suggest creative potential.

In subsequent years, her definition has evolved as follows:

> In keeping with most scholars who study the phenomenon, we define creativity as a process resulting in a product; it is the production of a novel and appropriate response, product, or solution to an open-ended task. The response must be new, but it must also be appropriate to the task to be completed or the problem to be solved. In addition, the problem must be open ended, rather than having a single, obvious solution. (Amabile and Mueller 2008:35)

There is another shift in perspective where the focus is 'process' (…production of…) that then leads to a 'product.' Additionally the product must have specific attributes of 'novel,' 'new,' and 'appropriate to the task.' Of note, two additional elements are introduced: first that the problem or task has certain attributes (i.e., 'it must be open ended'), and secondly, these 'creative solutions' are contextual to the required task.

<u>Example 5</u>

Robert Sternberg, a psychologist, and a significant contributor creativity research studies proposes the following definition:

> Creativity refers to the skills and dispositions needed for generating ideas and products that are (a) relatively novel, (b) high in quality, and (c) appropriate for the task at hand. (Sternberg 2007:34)

His definitional core seems to be the special attributes of an individual: i.e. the 'skills and dispositions' needed for generating ideas and products. The requirements to be met are ambiguous, 'relatively novel' and 'high in quality' (as Boden noted above), but are clear on one attribute 'appropriate for the task at hand,' which is being interpreted as adding some element of value.

<u>Example 6 and 7</u>

Scholars studying the domain of organizational creativity following Amabile have moved towards the 'new' and 'useful' requirements:

> Creativity or creative performance is commonly defined in the literature as the production of new and useful ideas concerning products, processes and

> services (e.g., Amabile, 1996; Ford, 1996; Oldham & Cummings, 1996; Shalley, 1991; Zhou, 1998). (Shalley 2008a:148)

Moreover, in a different article, in the same handbook Shalley elaborates:

> Creativity can be described as both an outcome and a process.
> (2008b:4)

Again, the focus is on ideas, with these ideas having the specific attributes of ‘new’ and ‘useful.’ A further comment is that creativity can be a process as well as a product, a position that this research adopts. This distinction becomes part of the models developed later in the thesis.

<u>Example 8</u>

Cameron Ford articulates a more focused definition:

> We favor the wording … to define creativity as a “domain-specific, subjective judgement of the novelty and value of an outcome of a particular action.” (Ford and Kuenzi 2008:66)

There are a number of focused thoughts contained in the definition. The outcome (not an idea, but a product or similar) is ‘domain specific,’ it must have special attributes of ‘novelty’ and ‘value,’ which are socially judged (and hence relative). It is moving closer towards Pucker’s tighter requirements.

These examples are summarized in the following chart that demonstrates the above range and variety of creativity definitions.

Summary of Creative definition perspectives			
	Author	**Perspective**	**Key Elements**
Example 1	US National Foundation	Multiple	Mixed and various
Example 2	Boden	Individual	Ability to generate ideas that are novel, surprising, and valuable
Example 3 & 4	Amabile	Product & Process	Appropriate observers agree that it is creative
	Amabile	Process	Process resulting in an open-ended product that is novel/new and appropriate to task
Example 5	Sternberg	Individual	Individual skills for generating ideas and products that are (a) relatively novel, (b) high in quality, (c) appropriate to task.
Example 6 & 7	Amabile	Product	New and useful
	Shalley	Product & Process	Both an outcome and a process
Example 8	Ford	Product (as an action)	Domain specific subjective judgement of the action's novelty and value

Table 9 Summary of Creative definition perspectives

Before suggesting a definition for the research context, a discussion of four different perspectives will add to my definition development.

The 4 Ps

From the overview, it is clear that the creativity literature, whether from a psychological or organizational perspective, demonstrates there are a wide variety of interpretations. Is creativity 'an ability', 'a product,' 'the quality of a product,' 'a process', an 'idea', or 'attributes of' a product? In part, it reflects four perspectives that the research community has used: that is from the perspective of the Person, the Product, the Process, and Press (context, also referred to as culture) (Runco 2004a). The literature has recognized these as the creativity 4 Ps (Rhodes 1961). Each of the creativity 4 Ps has been a research focus at one time over the past few decades (Moran 2009), with the then current definition influencing subsequent definitions. Adding additional confusion is that researchers promoting a specific perspective take a position that creativity is a unitary concept that should only be viewed from their unique vantage point. That is, a single 'P' perspective is applicable across all domains, and circumstances. Each P perspective can illuminate certain aspects of creativity, and these limitations require recognition. Drawing from the examples above, Boden is defining creativity in terms of attributes that a creative Person must possess. Sternberg and Ford's focus is on Product (attributes a creative product must possess.). If the definition were focused on the environmental factors (for example, competition) that influenced the creative outcome, it would be a Press perspective. Lastly, if as Shalley (and Amabile and Mueller) indicates¸ it can also be seen as a Process (how the creative outcome is accomplished), then this too is a distinct perspective. It is not the purpose of the thesis to define a unitary concept or framework, which can be used across all domains. Rather, in order to be as clear as possible, the perspective of any research should be articulated.

A Working Definition

In the examples from the literature above, different perspectives become apparent. However, a thread running through Amabile, Sternberg, Shalley, and Ford is the focus on product, and that the product has certain attributes. A second thread through the examples is that the product must contain two specific attributes: best summarized as new (or novel, surprising) and some degree of utility (valuable, created for response, appropriate to the task). The concept of a creative product, with specific attributes is incorporated in the working definition suggested below.

During the course of the research, a working definition was developed that both reflects elements from the creativity literature mentioned above, and field observations. While elements of the literature definitions above are used, it is not a synthesis, but defined as context specific to the research. It is important to mention again that the focus of this research is on the creative process, rather than the more general topic of creativity per se. However, it is necessary to define clearly creativity as the keystone to understand the creative process.

The definition of creativity in the research is:

> Creativity is the generation of ideas by individuals that are both 'new' and 'add value' which when implemented in a process at a specific location, context and time, results in a product. Both the ideas and product may be judged independently and at different times, and within different contexts.
>
> Creative processes are the methods by which creative products are developed.

The definition does move towards Plucker's requirements of parsimony with explicit and empirically testable requirements.[56] I elaborate these requirements below. Again, to reiterate, the definition is not intended as a unitary concept applicable to other creative endeavours, and was developed to highlight the specific nature of the creative process in the development of games.

The four requirements of the definition are:

1. <u>Ideas</u>

An idea is 'A thought or suggestion as to a possible course of action' (OED) or in the sense of Richard Dawkin's concept of the meme (Dawkins 1998, Martindale 2009), ideas

[56] The specific contextual meanings of both 'new' and 'add value' are explicitly defined.

are discrete entities as the essential core and material of creativity and the creative process. The research does not examine how individuals generate ideas and how they may by modified in a group or organizational setting. Ideas for the game, and use in the game, may come from anywhere: from the individual, from within the team, senior management, other departments, society in general, or from the wider games industry including competitors' products.

2. <u>Individual</u>

Individuals are always the source of ideas (Ekvall 1997). Interactions with other individuals may modify ideas, but individuals are always the source and authors of all ideas.

3. <u>New</u>

A critical element of my working definition is that an idea must be new to its context, and in this respect I am following Bilton (2007) and Kirton (2003). As Kirton (:138) elaborated, 'something is new or it is not. … it is not 'newness' that varies but its context.' Some researchers prefer 'novelty' to 'new,' but in the research context, the latter is a much tighter concept than the former.[57] A new game is defined in terms of different attributes (features) the game brings to the context. As will be elaborated later, ideas lie along a continuum, implying continued incremental variation. The context for creativity must always be specific as to time and place. For example, a level designer will have an idea for a new challenge for the player to solve. The idea may be derived from a different domain, a combination of ideas from disparate domains, or by individual creative thought – say ice-skating routines and ballet dancing introduced into an auto-racing game – but as long as it is new to the specific market environment of that game, it

[57] Mentioned in Chapter Six, an interviewee found novelty *'it's a little bit […] pejorative isn't the right word but it's about sort of dismissive, it's gimmicky'* (14:50). In the field interviews usage 'new' was found to be very effective in communicating the specific product attribute.

would meet that creativity requirement.[58] Even if the idea had been used in another genre of video games, it would meet the definitional requirement because it is both time and context specific.

4. Add Value

This aspect is discussed at length in later chapters. The following is presented as a preview for these later discussions. In the largest sense, a video game is a collection of ideas (Tschang 2006). Some are old ideas existing in the current software code base, and some are new ideas that are developed and implemented as the game is developed. At the discrete level, an idea that meets the 'new' definitional requirements above must add value to the game; it must be approved as a valuable part of the game. If it does not meet this criterion, the new idea would not be included in the game. The approval, or decision to include as noted in Chapter Three (Video Games and Their Industry), may come from any appropriate source, such as colleagues, supervisors, or executive management. Again, it is important to recognise that idea acceptance is specific to a time in the game's development.

At the individual or group level, there is a proxy for the anticipated value of an idea by the amount of time the organization has authorized to spend on that idea in terms of labour-months. That is, if an idea takes three labour-months to develop or implement and labour-month cost is £10,000 per month, it will indicate a minimum future value to the organization when the game ships. The key is in understanding that in making the decision to approve the idea occurs cost; there is the judgement that there will be more value (as revenue) returned to the organization, than if the cost were not incurred. The

[58] Only be being in the market can the new idea be socially judged as to value as discussed in Chapter Three.

idea may or may not prove to enhance the completed game and may be subsequently modified for a more positive result, or may be dropped from the game entirely. However, when the idea was implemented (a decision) the organization placed an explicit value on that idea as to its anticipated future value (by incurring current costs).

Additionally, the manager making the decision to include the idea in the game may ask the question, 'how many more copies of the game will the idea sell' and make the decision on that parameter. Alternatively, the decision-maker may be unable or unwilling to make the estimate and make the decision that it will enhance the overall quality of the game by getting a higher Metacritic score (as explained in the prior chapter), and include the idea on that decision parameter as a subjective or intuitive judgement. In either case, the assumption is that the decision will result in increased future revenue (value).

The definition has been argued from the viewpoint of those engaged in the process of ensuring 'creativity' is in a game. The corollary to this perspective is that of the gamer, whose objective is to play a game that, is new to him, fun, and entertaining (his added value), which he weights by the purchase price he is willing to pay. If a large number of gamers purchase the game, a large revenue stream is returned to the publisher. Thus, it is two sided; value is created for the organization, is also the sum of the value created for the individual gamers.

The collective accumulation of these new ideas into the completed game, results in a new product, which in its entirety is new to the marketplace.

Ultimately, value added is viewed solely within the commercial market of the organization; games are funded and developed for profit. Decisions as to whether to include new ideas in the game are made for the benefit of the publisher. That is, it is as much a decision process as an ideation process: and the ultimate reference is the game profitability. A successful game does influence later games, but that is a different context and does not add direct value to the organization funding the development. The influence of ideas on these other domains is not, and should not be, part of the senior executive management decision-making process.

Context

When a judgment is made as to whether an idea is creative, it must be defined as to a specific context, and any idea may have multiple contexts. A creative idea must be new to its context. It is not necessary to be new per se. Context includes; first, the local context of the game development environment; second comes the context of the market into which the game is shipped. A game idea may have been considered internally by the publisher for a number of game generations¸ but for various reasons (perhaps technical), was never included in a current game. It is new when it finally ships into the context of the retail market.

Other contexts may in turn be influenced by the idea; for example, other games may start using the idea. However, there is no direct benefit to the publisher of the game.

Decisions to introduce a new idea are often made with multiple contexts in mind. An idea might be implemented with a game to solve a gameplay problem, and simultaneously be implemented to increase the Metacritic rating for competitive reasons. Each of these contexts may involve a different judgement as to the creativity of the idea as expressed in the product. Nonetheless, in each case the criterion for creativity has been met, for that context. It is also important to acknowledge that any judgement (as a decision) must be specific as to time and place.

Implemented

A creative idea can only be judged when it is in the form of a specific and tangible result. Decisions are made to include an idea in a game, <u>in anticipation</u> that the result will add value to the game and ultimately to the organization. There is no way of knowing if, in fact, it happens until the game is completed and evaluated by the reviewers. This point is elaborated below; this follows the systems framework of Csikszentmihályi.

Product

For this research, the products are high cost (£15-25 million) games by independent publishers, produced by a development team of 75-100+ individuals. These teams will typically be engaged in the development project for 24-36 months.

Judgement

Ultimately, the new and valued added requirements are social judgements made with reference to a specific context (Amabile 1982, 1983a, 1983b, Csikszentmihalyi 1988) and as noted above, at a specific time. For games, the final judgement is the social judgment made by the reviews, such as Metacritic for the game as a complete product. Some judgements (as decisions) are made as to individual ideas prior to actual development or during development where there is no way of knowing the outcome prior to actual implementation. In these cases there is an 'anticipated value added' judgement made specific to that time and place, but nonetheless, a social context-specific judgement. The judgement is based on a specific social context. It should be noted that as creative judgements are social (and hence relative): they can, will, and do, change over time (Simonton 1998).

Creativity and Innovation

As in defining creativity, the same confusion and lack of understanding occurs with the concept of innovation in creativity literature. Some authors believe that the only relevant concept is innovation (Sutton 2002, Hargadon 2003) and creativity is not a useable construct. Others believe that creativity is a sub-set of innovation (West 2002b). In the example above, the National Science Foundation sees innovation as a subset of creativity. Others have defined creativity as only the ideation component (Shalley 2008b, Amabile 1997) of a two staged process where innovation is seen as the implementation of the creative idea. A related argument is the belief that innovation is the generation, development, and implementation of ideas' (Damanpour 1991:556). King (1995) argues that as commonly defined, these are integrated concepts. Ford (1996) and Man (2001) note that some researchers have taken the position that these terms are synonymous and that the two concepts are so inextricably entwined that they are inseparable (Van de Ven 1986, Basadur 1997). O'Shea has gone so far as to say that creativity and innovation can no longer be considered separate in research terms (2007). This research follows the latter three researchers, arguing that creativity encompasses the process from ideation through completion of the product. In game development, ideas are implemented throughout the development process so that making any distinction between ideas generation and ideas implementation is meaningless, and thus the terms will be treated as synonymous.

Section Two:

Literature Overview

In the early part of the last century, there was very little research focus on creativity. Interest increased after WWII from two areas. The President of the American Psychological Society in 1950 ignited the interests of psychologists to examine the field of creativity (Guilford 1950). This single bright spark has generated a formidable stream of research, primarily from the perspective of understanding the creative aspects of the individual, from a psychologist's viewpoint. At the same time, both the general public and business became more interested in creativity with the publication of popular works such as *Applied Imagination* by Alex Osborn (1957), *Lateral Thinking* by De Bono (1977) and his later *Serious Creativity* (1992), *A Whack on the Side of the Head* by Von Oech (1982), and Adams' *Conceptual Blockbusting* (1974). With the increasing pace of business change in the latter part of the twentieth century, corporations became more interested in understanding creativity to increase corporate effectiveness. Courses were even offered at major universities such as Stanford University (Ray and Myers 1986).

An overview of the creativity research literature can start no better than with a recent quote:

> Many who are unfamiliar with recent advances in the field assume that it has little broad relevance because it focuses only on the arts (and perhaps the sciences), has little validity because creativity it too ill defined, ephemeral, and "soft' to study rigorously, and provides little practical applicability because creativity cannot be influenced. But they are wrong. (Amabile and Mueller 2008; p. 34)

Within the last twenty years, the emphasis in creativity research has moved from individual psychology towards the examination of creativity within organizations. However, the roots of organizational research came chiefly from the psychological perspective studying individual creativity, although it proved difficult to separate individual creativity from the study of creativity in groups or within larger organization environments. The shift towards the organization has had the subtle and forcible influence of moving the frame of reference of creativity away from the earlier bias of the High Arts and Science. From the earlier foundation, the research has moved towards understanding the factors and dynamics that both enhance and inhibit the organizational creating processes from the individual, group, and organizational perspectives (Shalley 2008a, Shalley 2008b).

There are multiple ways in which to approach an overview of the critical literature emphasising organizational creativity. This review will follow the approach of Shalley and Zhou (2008b). In their overview, they segmented the literature into two major streams – the first being the field of psychology, and second from the field of organizational creativity.

Creativity in the Field of Psychology

The contributions from within psychology can be viewed from two perspectives: first, that of individual differences and the individual's cognitive processes. The second perspective leads into the development of cognitive models within psychology, including those of Campbell and Simonton.

Individual differences (traits or personalities) and cognitive processes (cognitive abilities). Mostly from historical interest rather than germane to this thesis, the earlier psychological literature focused on individual differences and attributes in order to find the special qualities of creative individuals, again with the bias towards the High Arts and Science – examples are the earlier work of Galton (1870) and Cox (1926) who looked at hereditary factors. Wallas (1926) proposed the now familiar multistage process of preparation, incubation, illumination, and verification as the creative process of the individual. Koestler (1975) felt that creativity was a bisociative process, or the combination of two unrelated thoughts, which was the key to creativity. A significant portion of the earlier work was dedicated to measuring original idea generation, idea fluency and idea flexibility as exemplified by Guilford (1967) and Torrance (1974). In the 1970s, significant contributions were made by Dean Simonton (1975, 1976, 1977, and 1997) studying primarily well-known individuals in the High Arts and Science over their lifetime to determine the factors of their achievements.

Much of the work centred on identifying traits of the individual from which multiple factors were isolated. The key individual factors were suggested to be:

> creative individuals tend to be higher on self-confidence, aggressiveness, flexibility, self-acceptance, unconcern with social constraints or other's opinions, sensitivity, introversion, and intuitiveness. (Shalley 2008b:8)

A second research stream focused on the cognitive process, the mental representations, and processes of creative individuals. Newell, Simon, and their colleagues (Newell, C. and Simon 1962, Newell and Simon 1972, Simon 1986) proposed that problem solving and creative thinking were the same as ordinary thinking processes. Another example of cognitive process is Kirton's (2003) Adaption-Innovation theory that suggested individuals have a preferred style of creative problem solving along a continuum where at one end the 'adaptors' used known processes and at the other end 'innovators' break tradition and devise unique solutions. One practical path that the research led to was Osborn's (1957) popular ideas on brainstorming and the subsequent further research on the techniques and benefits of the process (Paulus 2000, Paulus and Brown 2007).

<u>Conceptual Models within Psychology</u> Again as summarized by Shalley and Zhou (Shalley 2008b) researchers (Amabile 1983b, Rokeach 1965) established in the early research that individuals must be highly interested in the work to develop creative solutions, and that 'ability, intrinsic motivation, and engagement in certain cognitive stages are necessary for creative performance' (Shalley 2008b:9). Csikszentmihályi's work on problem discovery (Csikszentmihalyi and Robinson 1986, Getzels and Csikszentmihalyi 1976) 'lead him to suggest that the identification of problems that hold

the potential for creative solutions is partly driven by intense interest in and curiosity about a subject and by perseverance' (Shalley 2008b:9). He further suggested that there was a highly intense psychological state of 'flow' when the individual was fully and completely engaged in the challenge of the situation that was equal to the skill level required of the effort (Csikszentmihalyi 1990, 1991).

Shalley and Zhou (2008b) have further suggested that there are a number of significant models that have contributed, from the psychological stream of research, to our understanding of the creating process. Two significant models for my research are those of Campbell and Simonton.

One of the early influential models is Donald Campbell's (1960) Darwinian evolutionary model. This seminal model (in both its original and developed forms) is referred to in organizational creativity research as the BVSR model (Blind-Variation-Selection-Retention). Campbell's model described the conditions for creativity as 'a mechanism for introducing variation, a consistent selection process, and a mechanism for preserving and reproducing the selected variations' (Campbell 1960:381). He suggested that the variation process was blind. The meaning of blind is not random, but creativity eventually reaches a point where there a lack of knowledge, experience, or external references that can no longer assist in the initial generation of ideas.[59] Ideas were then 'independent of the environmental conditions of their occurrence' (i.e., blind) and 'going beyond the limits of foresight or prescience'. At this point the selection process was 'trial-and-error problem solving' and the 'greater the heterogeneity and volume of trials the greater the chance of a productive innovation' (all quotations from Campbell 1960).

[59] The important distinction between blind and random is further discussed in Chapter Five (The Creative Process Models).

As there are no external frames of reference, only ideas new to the context will provide the necessary way forward. A further significant development of the model is that ‘variations emerge from elements of previously retained solutions’ (Ford and Kuenzi 2008:65) or expressed in a more direct way, new ideas come from old ideas. This insight has been wonderfully captured in the phrase ‘there is no such thing as an immaculate perception’ (Hargadon, 2008; paraphrasing Gombrich, 1961). New creative ideas can then come from an original ‘usage’ of previously retained ideas, but these new ideas only emerge or are developed when the use of prior ideas will no longer meet the creative requirements. This is the essence of Campbell’s blind variation.

Simonton (1999a:322) argued that any creative perspective ‘must be inherently Darwinian’ and central to the perspective was Campbell’s BVSR blind-variation and selective-retention model. Simonton presented a formidable array of arguments supporting the position. Recognizing that there may be other views as to understanding creativity, Simonton argued that the BVSR perspective should be ‘placed at the very apex of the heap’ and that the ‘variation-selection process may subsume all the alternative accounts as special cases of the more general process’ (Simonton 1999a:322). Further, he argued that alternative theories are ‘metavariations’ or special cases for specific problems, and that:

> Because the variation-selection model can encompass such a diversity of processes at some profound level creativity must be Darwinian. In both cultural and biological evolution, it may constitute the single most important explanation for creative innovations … It will become the theory most consistent with the most impressive explanatory system in the psychological sciences. (Simonton 1999a:322-3)

The Campbell BVSR model and Simonton’s further argument are foundational to this research and are further developed and placed in context in Chapter Five (The Creative Process Models) as I develop my theoretical Model Set.

Section Three:

Organizational Creativity

Since the early 1990s, a stream of research has focused on creativity within the organization as an extension on the psychological research of the creative individual. Earlier foundational models in the research stream were Amabile's 1988 model where her prior componential model of the individual (1988) was extended to the organization. Her three factor model suggested that 'domain-relevant skills, 'creativity-relevant processes,' and 'intrinsic task motivation' factors were the cornerstones in understanding the individual's creative processes; these also form the basis for understanding creativity in organizations. The second significant model was that of Woodman, Sawyer, Griffin (1993) which recognized creativity was an individual level event that was affected by both individual and situational factors. It is these factors, interacting in the work environment, which generated creative products. Their model also emphasized further multilevel factors, identifying group and organizational factors, which would influence the individual's creative behaviour. Examples of influences at the individual level were history of the individual, personality factors, cognitive factors, intrinsic motivation, and the individual's knowledge. Factors influencing the group level were group norms, cohesiveness, size, diversity, roles, tasks, and problem solving approaches. At the organizational level, factors included culture, resources, rewards, strategy, structure, and technology. It was the combination and interaction of these factors that influences the creative generation of products.

Three further models in the field of organizational creativity were influential in developing my core models, and the subsequent suggested organizational application. These are the product framework of Sternberg's Propulsion Theory of Creative

Contribution; Drazin, Glynn, and Kazanjian's Multilevel Theorizing about Creativity in Organizations (1999), and Csikszentmihályi's (1999) Systems model.

Sternberg proposed a Propulsion Theory of Creative Contribution (Sternberg 1999, 2003, 2004, Sternberg, Kaufmann and Pretz 2002) to suggest that there are particular ways in which individuals invest their creative resources: 'creative contributors make different decisions regarding how to express their creativity' (2003:124). These decisions are types of creativity that 'propel' the field forward to where the creative individual believes it should be; and the individual will exert leadership in order to achieve this. The effort may or may not be successful. The importance for my research is that Sternberg's model suggested there were eight types of creative contribution. The use and understanding of these eight types of creative product have significant implications on the approach to creative timing, and development of an individual game. Additionally, according to Sternberg, these eight types of contribution may differ in the extent of creative contribution they make. Set in a graphical context, they are 'intended as closer to a nominal one than an ordinal one.'[60]

However, he does go on to say:

> There is no fixed a priori way of evaluating amount of creativity on the basis of the type of creativity. Certain types of creative contributions probably tend, on average, to be greater in amounts of novelty than are others. But creativity also involves quality of work, and the types of creativity does not make any predictions regarding quality of work. (1999:88)

[60] When these types of contribution are placed on a graph, they become; nominal – lying along the horizontal y-axis; and ordinal – on the vertical x-axis. This differentiation of independent variables is a central tenet of this research, and reflects the constructs of creativity of value (ordinal value), and newness (nominal value), the foundation of the Creative Continuum. The charts in Chapter Six, illustrate this point.

The critical phrase to note is that certain types of 'creative contributions' may have greater novelty than other types of creative contributions. The implication is that there is a continuum of product creativity along a nominal axis. Additionally, he suggests that there is the potential for increasing creativity (as novelty) within his eight different types. Significantly, he makes creative contribution (value) independent of the amount of novelty (newness), a position this research follows.[61]

Sternberg's eight types of creativity are detailed below, and are quoted in detail to convey fully the subtlety within the types. There are three main classifications: first, those types of creativity that extend the current paradigm; second, those types of creativity that reject the current paradigms, and thirdly, a single type that merges existing paradigms.

[61] Quality has multiple meanings and two are most important for this research: first, quality as social judgement (Metacritic), and secondly, quality as production values (or standards). The quotation subsumes both meanings.

Types of Creativity that Accept Current Paradigms and Attempt to Extend them

1. REPLICATION. The contribution is an attempt to show that the field is in the right place. The propulsion keeps the field where it is rather than moving it. This type of creativity is represented by stationary motion, as the wheel is moving but staying in place.
2. REDEFINITION. The contribution is an attempt to redefine where the field is. The current status of the field thus is seen from different points of view. The propulsion leads to a circular motion, such that the creative work leads back to where the field is, but viewed in a different way.
3. FORWARD INCREMENTATION. The contribution is an attempt to move the field forward in the direction it is already going. The propulsion leads to forward motion.
4. ADVANCED FORWARD INCREMENTATION. The contribution is an attempt to move the field forward in the direction it is already going, but beyond where others are ready for it to go. The propulsion leads to forward motion that is accelerated beyon the expected rate of forward progression.

Types of Creativity that Reject Current Paradigms and Attempts to Replace Them

5. REDIRECTION. The contribution is an attempt to redirect the point where it is toward a different direction. The propulsion thus leads to motion in a direction that diverges from the way the field is currently moving.
6. RECONSTRUCTION/REDIRECTION. The contribution is an attempt to move the field back to where it once was (a reconstruction of the past) so that may move forward from that point, but in a direction different from the one it took before. The propulsion thus leads to motion that is backward and then redirective.
7. REINITIATION. The contribution is an attempt to move the field to a different as yet unreached starting point and then move from that point. The propulsion is thus from a new starting point in a direction that is different from the one the field previously pursued.

A Type of Creativity that Merges Disparate Current Paradigms

8. INTEGRATION. The contribution is an attempt to integrate two formerly diverse ways of thinking about phenomena into a single way of thinking about a phenomenon. The propulsion is the combination of two different approaches that are linked together. (Sternberg 2003:126-7)

Table 10 Sternberg's Creativity Paradigms

As mentioned above, Sternberg argued that these directions thrust or propel the field forward. As mentioned above, these types are along a continuum, which must be considered <u>within a specific domain</u>. The three major types (extending current paradigms, rejecting and replacing current paradigms, and merging of paradigms) may all be considered increases in creative contribution. These creative classifications are similar to

McFadzean's (1998) preserving, stretching, and breaking creativity techniques, which he also sees as lying along a continuum. For example, the replication and extension of the current paradigm is where a film is translated in a game as an "idea" which is moved from one domain to another without changing the central concept. An example of projection and replacement of the current paradigm is where an older film is recast to bring it up-to-date. The older core "idea" is the same, but is recast for modern social tastes. Current paradigms are merged where two ideas from different films are brought together into a new context such as the Western idiom of the conflict between cattle ranchers and sheep ranchers is combined with the turf wars of drug gangs in large modern cities. The central concept is that the movement along the continuum reflects an increasing movement from the known to the unknown. Other researchers have proposed a similar continuum from closed to open problem solving spaces (Getzels and Csikszentmihalyi 1976).

Drazin et al.

Drazin and his colleagues (Drazin et al. 1999) use Weick's (1995) multilevel sense-making approach (intrasubjective, intersubjective, and collective) to propose a model that suggests the creating process is not the same at different levels of the organization. The viewpoint expands upon the earlier hierarchical perspective that the group was only the sum of the participating individuals (Amabile 1988, Woodman et al. 1993). Drazin et al's view is that creativity is a process. At the individual level, creativity is the 'psychological engagement' of the individual. From the organizational level perspective, individuals engage throughout the organization at all levels. At the project level, creativity was the changing balance between different occupational subcultures. They used the example of large-scale long duration projects to show there was a power balance between the different cognitive frames of reference between occupational subcultures (e.g., managers and engineers) that shifted during the project in response to various crises in achieving the planned results. The model illustrated the complexity of group process and further that the complex process does change over the project's duration.

The 'power balance' shift that Drazin et al refers to is also seen in game development as the balance between the Designers (creatives) and the Producers (suits), while also recognizing the balance changed during the development process, a topic discussed extensively later in this thesis.

Csikszentmihályi

Csikszentmihályi (1999) developed his systems model of creativity to emphasize that creativity is not solely the mental process of the individual, but is 'as much a cultural and social as a psychological event. … it has become increasingly clear that variables external to the individual must be taken into account if one wishes to explain why, when, and how new ideas or products arise from and become established in a culture' (Csikszentmihalyi 1999:313). From his perspective, creativity is not an individual subjective experience, but 'it must refer to a process that results in an idea or product that is recognized and adopted by others' (Csikszentmihalyi 1999:314). A key Csikszentmihályi argument is that there is no 'objective quality' called 'creativity' that is 'revealed' in a product, but only external expert judges have the capacity to recognize the quality. However, these expert judges make decisions based on their 'experience, training, cultural biases, current trends, personal values, and idiosyncratic preferences.' Therefore, there are no inherent qualities in a product, but only reactions of others to that product, and that:

> it follows that what we call creativity is a phenomenon that is constructed through an *interaction between producer and audience.* Creativity is not the product of single individuals, but of social systems making judgments about individuals' products. (Italics in original)
> (Csikszentmihalyi 1999:314)

The individual is part of an environment that has two significant aspects: a cultural or symbolic aspect that Csikszentmihályi calls the domain and a social aspect referred to as the field. The field is composed of gatekeepers that make the social judgements to allow the ideas to flow into the domain. Csikszentmihályi describes creativity as a process of the continued interaction of the individual, the domain, and the field. The domain is a central part of the process as it is not possible to introduce new ideas without any previous reference.

> Original thought does not exist in a vacuum. It must operate on a set of already existing objects, rules, representations or notations … Without rules there cannot be exceptions, and without tradition there cannot be novelty. (Csikszentmihalyi 1999:315)

Thus, creativity occurs when an idea or product makes a change in the domain. Changes will only occur when the gatekeepers (i.e., field), who are the experts in the domain, accept these new ideas as part of the domain. However, most new ideas quickly fade into the ether without making any change in the relevant domain.

Csikszentmihályi also sees an analogy to the process of evolution when a variation is 'selected' by the environment and passes to the next generation. Within his model the variation is analogous to the contribution of the individual, the selection comes from the field, and 'the transmission is the contribution of the domain to the creativity process.'

> Thus, creativity can be seen as a special case of evolution; specifically, it is to cultural evolution as the mutation, selection, and transmission of genetic variation is to biological evolution. (Csikszentmihalyi 1999:316)[62]

Thus creativity results in a change in the cultural symbolic system as reflected in the 'thoughts and feelings of the members of the culture' or the domain. A further analogy is drawn with Dawkin's memes (1998), the 'units of imitation' that were the 'building

[62] This is an alternative expression of the BVSR model.

blocks of culture' and the biological gene. As Csikszentmihályi sees it, memes do not normally change over time, but when they do, creativity occurs.

Social Validation

The social system validates – that 'in order to be called creative, a new meme must be socially valued,' being the only way that validation is achieved. It is context defines value:

> But this social validation is usually seen as something that follows the individual's creative act and can be – at least conceptually – separated from it. The stronger claim made here is that there is no way, even in principle, to separate the reaction of society from the person's contribution: the two are inseparable … creativity is as much the result of changing standards and new criteria of assessment, as it is of novel individual achievement. (Csikszentmihalyi 1999:321)

An integral part of his model is the gatekeeper, or the field, who have 'the right' to allow memes to enter the domain. Those in the field make the judgements as to the suitability of that creative idea or product into the accepted body of knowledge. He observes that every field 'needs a certain degree of autonomy' to make its judgements in terms of excellence within the domain, but autonomy may be compromised by other elements of the society. For example, historically advances in science were not accepted during a specific historical period because of the constrictions of the Catholic Church. It also reflects whether the domain is 'ideologically' open or 'closed' to new memes. The openness of any field 'depends in part on its internal organization, in part to its relationship to a wider society.' With too much openness, a field can become diffuse and lacking in coherence. So from the field's perspective 'It requires an adroit balancing act for those responsible for evaluating novelty to decide which new ideas are worth preserving.' Of significant note, fields may exist at different levels. For example, within an organization a programmer's superior, acting as the field in the development context may accept his idea or meme but the idea may not be accepted within the industry at a higher organizational level. Each of these decisions is made within a different context.

The process is circular in nature as the idea or meme of the individual is accepted by the field, which then influences the domain, which in turn influences the individual by its acceptance. Thus, Csikszentmihályi's model is dynamic in nature with a continuous influencing process occurring between the individual-field-domain elements. As he summarizes,

> creativity cannot be recognized except as it operates within a system of cultural rules, and cannot bring forth anything new unless it can enlist the support of peers. If these conclusions are accepted, then it follows that the occurrence of creativity is not simply a function of how many gifted individuals there are, but also how accessible the various symbolic systems are and how responsive the social system is to novel ideas. Instead of focusing exclusively on individuals, it will make much more sense to focus on communities that may or may not nurture geniuses. In the last analysis it is the community and not the individual who makes creativity manifest. (Csikszentmihalyi 1999:333)

Alternatively, as Csikszentmihályi expressed it with even more panache:

> we need to abandon the Ptolemaic view of creativity, in which the person is at the center of everything, for a more Copernican model in which the person is part of a system of mutual influences and information. (Csikszentmihalyi 1988:336)

The Copernican model¸ encompasses the organization as the originator of creative products (via its individuals), as part of a system of influences and information, which are reacting with the environment.

After this more general view of creativity models, the chapter will now review the more focused aspects of creativity within the video game literature.

Section Four: Video game literature review

The literature is sparse at the conceptual and theoretical levels on the creative aspects of video games development. Much of the formal literature relates to the social impact of games, particularly concerning the effects of violence. A search for ‘video games’ on Google Scholar shows the leading responses relating to ‘aggressive behavior,’ ‘violence’ and the negative social impact of games on younger individuals, the most prevalent players. The formal research and analysis of the creating process of video games has had contribution from Tschang (2003a, 2003b, 2005, 2006, 2007, Baba and Tschang 2001) and Peter Zackariasson (Zackariasson, Walfisz and Wilson 2006, Zackariasson, Styhre and Wilson 2006). Tschang’s primary contribution is the articulation of the essential nature of video games (as discussed in the prior chapter) and Zackariasson’s contribution has been primarily on massively multiplayer games and business relationships within the industry.

In a very perceptive article, Tschang and Szczypula (2006) presented an argument that insights to creative video game development derive from three perspectives: idea creation, constructivism, and evolution. These conclusions came from a content analysis of DeMaria and Wilson’s (2002) detailed thirty-year history of the video games industry, and further supported with interviews by significant video game creators and developers.

As Tschang and Szczypula state in their introduction, they ‘propose a view of video games as products that are composed of creative ideas’ (Tschang 2006:270) which are derived from the individual’s creative processes. These ideas:

> provide the seeds for developing a particular game, help distinguish them as they are developed, and as a consequence, imbue the individual games with their uniqueness and innovative quality.
> (Tschang 2006:275)

The most important idea sources they found influencing the creative aspects were inspiration, external influences, and the creator's background. Firstly, 'inspiration ideas' generated from other media such as movies and TV, books, other computer games, toys and other non-computer games, and ideas from other spheres of life. The argument was extended to the conclusion that the 'broad range of inspiration suggests that there are almost no limits to the source material for games' (Tschang 2006:280). Secondly, 'influences' were a more subtle impact on the game, primarily from other games. Thirdly, the background of the creators either from their experiences or from significant personal interests played a part in their game conceptualization.

Their second major characteristic of game development was the concept of 'constructivism,' which they saw as 'the ability to combine concepts, sometimes from disparate domains, into a coherent whole for the purposes of a game' (Tschang 2006:281). The ideas from inspirations and influences were combined into the 'coherent whole' of the game. The manner in which these ideas were combined was seen as either imitating other games or game concepts, combining ideas, and adaptation or addition of ideas (either moving a concept from a different domain, or adding an idea to an existing concept).[63]

The third characteristic is that during game development there was evidence of the nature of the game changing as its constituents changed. Their data showed that the evolution was in two forms: as evolution of an individual game's design during development and evolution across different games. While recognizing that game design becomes more detailed during development, they significantly extended the concept to include 'more striking shifts … such as those resulting from the addition of new ideas' (Tschang

[63] This is another way of expressing Koestler's bisociative process.

2006:282) during the development itself. The evolution may occur because ‘a feature or interesting phenomena’ becomes apparent and induces additional efforts in that direction. These new ideas may come from many sources such as the availability of new technologies, the creator’s desire to correct problems in previous games, or the sensing of a market opportunity. Additionally, evolution as the introduction of new ideas to solve problems may also occur when original designs present problems (for example, when the game is not engaging), or when the design outreaches the technology available for implementation. Finally, they see evolution (in a somewhat looser sense than Campbell and Simonton) occurring ‘across games’ in a constructionist manner where ideas are borrowed or adapted from earlier games into the current game development.

These three perspectives of idea creation, constructivism, and evolution are closely related. Idea creation can be seen:

> at the core of an evolutionary approach to characterizing game development. Because of the constructivist nature of the product, very different ideas from disparate sources can be assimilated into the product. At the same time, the nature of the product and of idea creation is such that ideas can occur throughout the product development process, and in the process, the concept (and the associated design) behind the product can “evolve” throughout the process. (Tschang 2006:285)

Their evolutionary approach is an enhancement of the Campbell/Simonton BVSR model into a recurrent process during game development. The constructivist nature of the product can be seen as the assimilation of Koestler’s (1975) bisociative ideas that creativity was the combination of two different ideas.

After describing the significant models influencing my research, the following section reviews and discusses the implications of these models.

Section Five: Review of the Models

The models of Campbell, Simonton, Sternberg, Drazin et al, and Csikszentmihályi are central in the development of the research with the model of Tschang providing a further integration in understanding game development. Of particular significance is the ability of these four core models, to be viewed at the individual, group, and organizational levels. Continuing below is an elaboration of the significance of each of these models.

The Campbellian evolutionary model has significantly influenced creativity research. The model with the concepts of variation, selection, and retention (BVSR) processes has enabled researchers to 'better understand complex dynamic interactions among established knowledge, social convention and new ideas' (Ford and Kuenzi 2008:65). While it cannot be claimed that the Campbellian influence is the core mechanism for all creating processes, its influence is certainly seen in the Csikszentmihályi and Tschang models.

The BVSR model brings into focus an underlying tension between Variation ('new') and Selection-Retention ('value') in the commercial domain. Variation implies a continued desire to add new features and enhancements to the product with a view to constant improvement. Retention is the desire to capture the current value by commercially exploiting the product in the market today. They are both required during game development, and are naturally pushing in opposing directions and 'are inherently at cross-purposes to each other' (Ford and Sullivan 2005). The balance can change during production:

> Specifically, as individuals, teams, organization, or industries become increasingly adapted to previously retained variations, the motivation and ability to generate and select new variations (creative alternatives) declines. Variation processes (e.g., brainstorming, experimenting, etc.) are more likely to generate a wide range of novel ideas when selective retention processes (e.g., memory, routines, norms, standards, etc.) place few constraints on individuals thought processes.(2005:246)

The tension between the idea generation– individuals do not stop having ideas during any phase of game development – is naturally set against the retention component expressed as the 'production element' of a project that is charged with execution on time and budget. As seen in the field research, it was the tension between the game designer (new ideas) and the producer (production) function of the game development team. The selection process is the resolution of these natural tensions. Also as noted by Ford (2008) the BVSR model can emphasize aspects of the definitions of creativity – as in the definition of creativity proposed for this research. With quotations from my definition Chapter Four expressed as variation (V) is the 'generation of ideas,' selection (S) as the 'judged independently' (i.e., decisions) and retention (R) as the process that 'results in a product,' that is, ideas are retained in the product.

As mentioned above, Simonton argued that 'any' creative process must be Darwinian and significantly advanced Campbell's argument of the 'blind' variation. He argued that as the 'amount of creativity required increases, the blindness of the search procedures will proportionally increase' (1999b:66):

> When no algorithm exists that will immediately solve a given problem, the creator must fall back on one or more heuristic principles that seem to have worked well for similar problems in the past. If these fail, the criteria must be relaxed to allow the resurgence of heuristics ever more remotely related to the intransigent problem. Furthermore, eventually the individuals have to resort to unguided recombination of the diverse techniques and approaches acquired over a considerable range of solutions. This progression, again, entails a descent into an increasingly Darwinian form of creativity. Because the blindness can continuously act as a function of the problem difficulties, we should not really speak of creativity as Darwinian or not Darwinian. Instead, it is more accurate to speak in terms of relative importance of the Darwinian processes in the origination of a creative solution to a specific problem. (1999b:66)

What is essential in the understanding is that the nature of the creative process changes as the solution required changes from the known to the unknown; ultimately, there are no frames of reference and the solution must then come 'blind' and is not related to any known reference. The extreme Darwinian solutions are not random, but can be the use of a serendipitous idea from another frame of reference (or domain). Also underlying the argument is an explicit assumption of a continuum of required solutions (ideas and/or products) moving from the easy to the difficult and more complex. These solutions are in the form of ideas from the selection-retention process, but most importantly, a decision process drives the selection of these ideas:

> It cannot be overly stressed that logic and reason must play a critical part in any Darwinian model. Often the criteria by which ideational variations are selected are logical and rational … logic and reason that impose constraints on what variants are chosen for further development. (1999b:62)

Within an organizational context, these constraints can be imposed by the management and leadership functions in terms of setting budgets, timetables and required quality levels (as Metacritic ratings) and the required level of new attributes (game features). I propose, and will elaborate further in Chapter Five (The Creative Process Models), the argument that Sternberg's types of creative products lie along a continuum representing an increasingly Darwinian process. That is, his 'replication' is at one end of the continuum, and his 'integration' continues towards the other end of the continuum.[64] It is a relative concept, rather than an absolute positioning of any product.

The significance of Drazin's model for this research is that in contrast to other major creativity models which view the creative process as static (Woodman et al. 1993, Ford 1996), the creative process is dynamic and changes during production. Tschang and Szczypula (2006) made a similar argument above. That is, there are dynamic forces acting which cause changes in the creative aspects of the final product. In the Drazin et al

[64] Games are viewed monolithically along this continuum; it is a convenience device as games are an amalgamation of the many creative elements such as graphics, gameplay, and storyline.

example – occurring during a series of crises – the balance of influence moved between the engineers (the creatives) and the management (representing time and money constraints) to resolve the crisis of the moment. In an organizational context, there is a dynamic interchange as the underlying tension between the Campbellian Variation, and Selection-Retention modes. In a review of the Drazin article it was pointed out (Ford 2000) that there are other influences such as executive leadership which impact the creative constraints of the production process, as well as development time and budget.[65] Thus, the production process is subject to multiple influences (Drazin, Kazanjian and Glynn 2008) over time, and static representations of influences as seen in a significant portion of the literature does not fully illustrate the dynamic complexity of the organizational creating process.

The significance of Csikszentmihályi's model is that the judgement of the creative process is situated in a social context, where the emphasis is on the acceptance of the idea or meme by others (the field) as the validation of the creative product. As I have mentioned above in my discussion of the definition of creativity and in the earlier comments on Csikszentmihályi's model, in a commercial game development context there are multiple steps and stages (in different social domains) in the acceptance of a creative idea both before (i.e., during production) and when the product reaches the market. Additionally, as Csikszentmihályi argues these domains may be 'open' or 'closed' to new ideas because of the social values of that particular time. In the research context, the social values are the game features that are valued by the field (reviewers) at the time the game comes to market. Alternatively, putting it colloquially, whatever is 'hot' and 'essential' are the ideas and memes the reviewers (as summarized by

[65] It is argued in Chapter Six (Discussion and Implications) that it is the leadership's task to ensure that the key creative constraints of quality level (as Metacritic rating) and new features are established.

Metacritic) are currently emphasizing and admitting to the market (domain). One of the characteristics of entertainment markets is that they are ever changing, with short market windows (Caves 2000). It is the decision-maker's responsibility to understand these 'hot' and 'essential' ideas.[66]

The elements of idea creation, constructivism, and evolution in Tschang and Szczypula's model found support in the Campbellian model. Their suggested 'influences and inspirations' were ideas from multiple external sources; these were constructed into a game, and the game evolved during the development. The Campbellian model places more emphasis on the selection process. Their argument that game development is a dynamic and changing process paralleled those of Drazin, who saw the representatives of the new ideas (the engineers as creatives) as the implementers of the new ideas incorporated into the game. Both Tschang and Csikszentmihályi see the 'idea' as the fundamental building blocks from which creative products are derived, and which the decision-makers select. In the next phase, ideas need to be implemented into a final product.

From this integrating review of the key models in the literature, the following section will critically comment on certain key aspects of the organizational creativity literature.

Section Six: Literature Critique

In this final section, I will make a number of observations and critiques of the organizational research literature from the perspective of my research. The observations will cover: creativity definition, problems with separating ideation and innovation,

[66] Not only for games shipping today, but the requirement to anticipate what will be 'hot' and 'essential' in two years for new games going into production.

omission in acknowledging the critical nature of decision-making in the selection of the most appropriate ideas.

As Basadur suggested, understanding creativity (and hence the creative process) is a difficult and complex process (2005), even without the confusion caused by a lack of definitional consensus. In the opening section of the chapter the lack of a precise definition of creativity used consistently causes difficulty in understanding, comparing, and bringing together the various strands of the research literature, both from within and across research literature streams. In part, it is due to the different perspectives taken by the researchers: i.e., the understanding of the influences on the individual from the psychologist's viewpoint is different from that of organizational researcher's at the group or higher organizational levels. The validity of the perspectives is not in question, but it does cause difficulty in achieving an understanding and comparing (and integrating) the different perspectives when reviewing the creativity literature relating to creative organizations. Factors influencing the creative process associated with one perspective may or may not have any significant impact from another perspective. Alternatively, significant factors at one level may swamp or override significant factors seen from another perspective. An unarticulated assumption throughout the organizational creativity literature is that creativity is a unitary concept, and thus does not change from perspective or context. Until the research streams come together starting with an agreed definition, the underlying assumption will remain unchallenged. In addition, from a common definition the factors isolated from different perspectives can be assessed, compared, and integrated into a deeper understanding.

As there is uncertainty in the definition of creativity, there is uncertainty in both the understanding of innovation and the relationship with creativity. The current definition of organizational creativity as represented by Zhou and Shalley (2008) is creativity which is only concerned with the ideation phase of the creating process and focuses on those factors that facilitate or hinder the phase exclusively. The often quoted definition of innovation is that of West and Farr (1990) being the 'introduction and application … of ideas, processes, products or procedures which are new to that job, work team or organization and which are designed to benefit the job, the work team or the organization. The key phrase is the 'introduction and application.' As mentioned above, West (2002b) has argued that creativity is a sub-set of innovation. It is not my intent to resolve these differences, already suggesting in my earlier definition that this research will use the terms as synonymous. However, within both research concepts and literature streams there is an underlying assumption of two distinct phases, first the idea phase followed by the implementation phase. There are certainly examples of these two distinct phases such as the architectural drawings of a house, or the blueprints for a ship for which the 'creative phase' is the completion of the plans prior to the commencement of execution.

However, making this universal assumption is unduly restrictive, as Tschang's and my own research have illuminated in the game development process. In the development of games, there is an early phase of high ideation, but as earlier suggested, new ideas are adopted into the game all through the development process.[67] The organizational creativity and innovation streams have separated when they have much to contribute as a seamless field of research.

The creative process cannot occur without implementation and execution; otherwise, there are no product and no way to make any final judgement of products (cf Csikszentmihályi). The generation of ideas is a necessary but insufficient condition. I

[67] The different 'situational phasings' of the creative process is further discussed in Chapter Six (Discussion and Implications).

would suggest that the emphasis on ideation comes from the early psychological roots with the emphasis on understanding the creative psychology of the individual and generation of creative ideas. There is the well-known phrase attributed to Edison that creativity is ‘1% inspiration, and 99% perspiration,’ that better captures what usually happens. A phrase used in the game industry mentioned many times during the interviews was ‘Ideas are a dime a dozen, it is execution that matters.’ The disproportionate focus only on ideation in organizational creativity has constrained the research into a narrow path that will ultimately need to become more encompassing for organizational research to continue to mature.

As noted already the literature on organizational creativity has focused its efforts on ideation and those factors that enhance or inhibit its effectiveness. This along with making the implicit assumption of a two-staged process (West 2002b) has left a significant gap between the ‘idea only’ literature stream, and the ‘idea complete and implemented’ or innovation literature stream. The lacuna is where is the decision-making process in selecting the appropriate ideas, and committing to move forward to execution. In the two-stage model, there is the implicit assumption that all decisions are within the planning stage. I would argue that the selection of the appropriate idea is as equally important as the generation of the idea, whether it be at the individual, group, or organizational level. The Campbellian BVSR model recognizes the step explicitly. I further suggest that the omission in the literature has again unnecessarily constricted and narrowed the organizational creativity research field, which will eventually need to incorporate the decision-making process as a critical piece in understanding the creative process. The lack of acknowledgement of the decision-making process leads to a further question: what is the key assumption that is underlying organizational research? One of the very early and often cited examples in the history of creative thought is the Eureka or

Aha! moment when Archimedes jumped from his bath and ran through the streets shouting that he had found the answer to determine the amount of gold in the king's crown. A similar story describes Kekule's working out the structure of the benzene ring after visualizing snakes biting their tails while dozing by the fire (Weisberg 2006). The assumption of the 'complete idea' ready for the next stage has reappeared in the literature as a key underlying assumption. Of course, ideas are generated with the Eureka moment, but it is not the only method, as the considerable literature on brainstorming would suggest. Thus, the decision-making process that links ideation and execution (and the interaction between them) has been passed over in the literature streams.

SUMMARY

The chapter opened with various definitions of creativity and suggested a working definition to provide a clear foundation for the research on the creative process. It was followed by a discussion of the individual factors in the creativity definition. Once the differences between the definitions of creativity and innovation were articulated, the position was taken that the terms should be used synonymously.

Following a historical literature overview tracing the early psychological roots into the current organizational studies, Campbell's BVSR model and Simonton's Darwinian arguments were presented. Three further models of organizational importance were discussed; Sternberg's Propulsion Model of Creative Contribution (1999) laying the foundations of the Creative Continuum Model developed in the following chapter, Drazin, Glynn, and Kazanjian (1999) sense-making model with its clear articulation of the time element and fundamental changes during the creative process. Finally, Csikszentmihályi's (1999) sociocultural systems model was then introduced with the Person, Domain, and Field components of creativity.

From the limited research in creative game development, Tschang's (Tschang 2006) findings of idea creation, constructivism, and evolution were introduced. A review and commentary on the core models was then presented.

The chapter closed with further commentary on creativity definitions, problems associated with the conceptual separation of the creativity and innovation streams of research, and the lack of recognition of the critical nature of the decision-making process. The literature strands in the chapter will from the foundation for my research Model Set developed in the following Chapter Five (The Creative Process Models).

CHAPTER FIVE

THE CREATIVE PROCESS MODELS

To create is to produce.
Chief Games Designer (Interviewee 31:21)

Introduction

In prior chapters, the developmental overview of large high cost games, their industry, a review of the creativity literature, and the thesis research fundamentals, were described. Framed in an overall Schema, in this chapter, I propose two models that deconstruct the creating process into parts that give a better understanding and consequently enable better management of the creating process. Part One of the chapter covers the four discrete creating elements – Ideation, Decision, Execution, and Iteration – of the first model, the Core Creating Mechanism (CCM). Ideation and the Core Creating Mechanism lead the analysis, followed by an extensive discussion of decision-making, a very under-appreciated element in both the literature and our everyday understanding of the creative process. Part One concludes with the deconstruction of the Core Creating Mechanism into four operating modes that show how the Core Creating Mechanism works in practice. The analysis moves the understanding of the Core Creating Mechanism to a deeper level with the presentation as a toolset – tools used for specific tasks in the creating process. The individual tools are familiar in theory and practice, but are now presented in an integrated framework that enhances the understanding of the complete creating process in game development.

Part Two presents the Creative Continuum, a model suggesting that the ideas and products that result from the working of the Core Creating Mechanism lie along a differences continuum reflecting varying and increasing degrees of ‘newness.’ The Creative Continuum highlights the critical nature of the definition of creativity as ideas reflecting two independent variables – ‘new’ and ‘add value.’ The Creative Continuum challenges one of the commonly held implicit assumptions of the discontinuity of ‘creative products’ (i.e., paradigm breaking) and proposes that all creative products lie along a continuum with an independent variable, ‘value,’ operating along the Continuum.

In presenting the two models, perhaps it is prudent to remember:

> The social sciences do not produce deterministic laws from which there are no deviations. (Galenson 2004:131)

PART ONE

Section One: The Creative Schema

The Creative Schema is an outline of the creative process, and the place of the Core Creating Mechanism and the Creative Continuum in that process. The process originates in an overall organizational context (specific to time and place), and through the operation of the Core Creating Mechanism generate a product that is situated on the Creative Continuum[68].

The development of these large games originates in an organizational context. As mentioned in Chapter Three (Video Games and their Industry), there are on-going organizational requirements to develop these large risky games for revenues and profits. It is in this context, major decisions are made to start the game development preceding the operation of the Core Creating Mechanism and Creative Continuum, and the

[68] The choice to use spectrum as the substrate in the Creative Mechanism is to distinguish changes of a number of elements, as opposed to the use of continuum as the substrate in the Creative Continuum as an unbroken change of a single element.

hierarchy of Ideas.[69] The organization's leadership faces major decisions among which are: start a new game (original Intellectual Property, IP) or continue to develop an existing franchise. Influencing these decisions are what are the resources available – ranging from technical, financial, personal and talent, an evaluation of the organizations ability to deliver the game on time and on budget – to an assessment of the market in two years' time when the game will ship. It is also argued from the research, that the leadership must ensure that two specific creative process constraints for the game are defined: first, the required quality level (reflecting the required value), and secondly the required new feature set (reflecting the required newness) to guide decision-making during game development.

The above decisions are the impetus that start and guide the game development process. As is extensively argued in the chapter, decision-making is a fundamental operation of the Core Creating Mechanism and the creating process. Whether at the conceptual level or in the operation of the Core Creating Mechanism, there is no question that decision-making is at the core of the creating process.

This chapter sets out the 'how' of the creative process. As developed earlier, the definition is:

> Creativity is the generation of ideas by individuals that are both 'new' and 'add value' which implemented in a process at a specific location, context and time; results in a product. Both the ideas and product may be judged independently and at different times, and within different contexts.
>
> Creative processes are the methods by which creative products are developed.

[69] The hierarchy of Ideas is introduced later in this chapter.

The relationship between the creative process, context, product, and outcome are set out in the 'Creative Schema' below. With the impetus from the revenue and profit requirements providing the energy (with the appropriate decisions), ideas then become the starting point, as will be discussed in the next section.

Section Two: Ideas

Ideas are the fundamental building blocks – the raw material – of the creating process, and are the core of my working definition of creativity.[70] As Goldschmidt and Tatsa articulated, 'every creative outcome can be traced back to good ideas that started it off' (2005:593). The idea is a 'unit of scientific analysis' that is 'objective and operational' as in other scientific concepts. An idea may be regarded as a 'bit of information' (Runco 2007a) , referring to Miller's (1956) influential paper suggesting that short term memory is limited to 7 (± 2) bits of information. Runco further indicates that 'Bits are at least as ambiguous as ideas. They vary from person to person … they are useful concepts and units of cognition' (Runco 2007a:396).

The idea as the unit of cognition extends to encompass the meme as the fundamental unit of cultural transmission:

> A meme, of course, is defined as the fundamental unit of cultural transmission. From the evolutionary perspective, it plays the role in cultural change equivalent to that of the gene in biological change: as the basic unit of inheritance allowing the accumulation of adoptions. The idea is that, like a gene, a meme is a *replicator* (a concept also first defined by Richard Dawkins in the *Selfish Gene*). Genes replicate through the duplication of DNA strands; cultural replication, or the duplication of memes, takes place through the social transmission of information. (Aunger 2006:176)

[70] As used here, an idea is a single entity, when more often than not they are incomplete and need more development in the form of combining with other ideas and/or iteration to refine further.

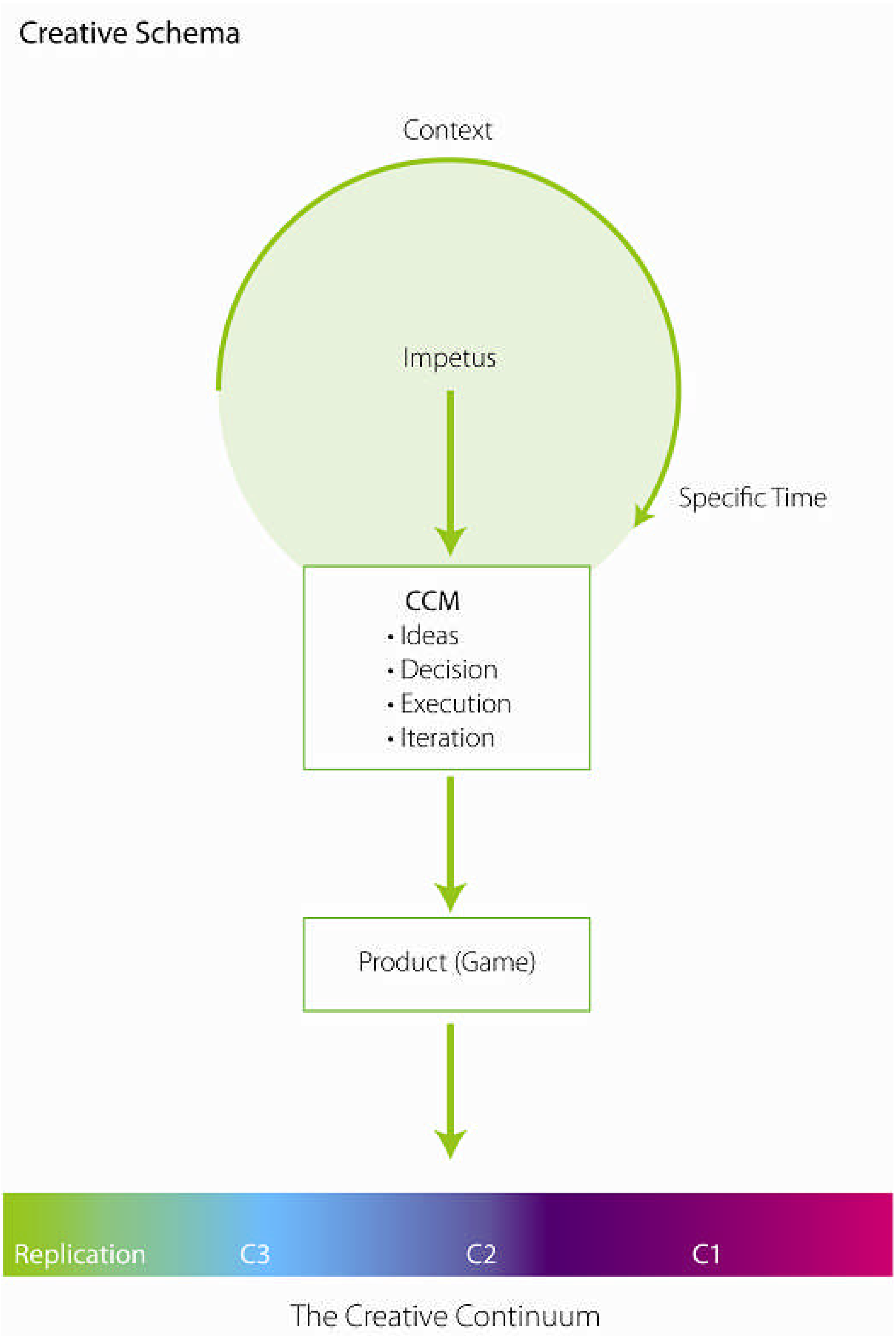


Figure 1 the Creative Schema

The idea is the basic unit of analysis in the creating process that is both malleable in the sense of open to change, and is transmittable in the sense of being able to progress from an individual to another individual (or group of individuals) as a meme noted above. All ideas originate in individuals although they may be, and are, modified by group processes. A work conversation discussing a new idea for inclusion in the game is an example of a modification of an idea between individuals or groups of individuals. As ideas are from, and in, an individual's mind, they are ethereal and ephemeral until executed and embedded in a game. They are judged as 'working' in a game's context when adding value to the game experience. Not all ideas are new to a game (or context), and so any game is a mixture of old and new ideas that collectively are melded into a new totality. Games are the sum of 'tens of thousands' of ideas with the probable rejection of countless more during the development. Certain 'larger ideas' are driving the process at the beginning of development, the Pre-Production phase, where the overarching concept is developed. Many ideas of which the team were already aware are implemented during development: e.g., ideas not implemented in the team's previous games, or new ideas from other publisher's games. Of these ideas, it might be said, 'their time has come' for the new game. Other new ideas arise from the perspective gained during development. These are the evolving ideas as suggested by Tschang earlier in Chapter Four (Literature Review). The contextualizing of ideas is oriented towards the future, the state of the game when these ideas will be implemented. As Ford saw it, 'decision makers must consider the relative weight or ratio given to ideas derived from two temporally distinct sources of knowledge – expectations constructed from remembering past experiences, and visions derived from imaging the future' (Ford 2002:635). The combination of the old and new ideas drives the creating process forward, with orientations that are towards the future.

In this discussion, the focus has been on new ideas. During game development there is no distinction made between new and old ideas per se, just as there is no distinction between big ideas (concept of a specific game) and lower level ideas (the colour of the villain's tunic), all the way to the colour of the last pixel. The operating question is 'Does the idea 'work' in this context?' rather than is it an old idea or a new idea. The unit of analysis remains the idea without any distinction. The creating process is a unique combination of both. According to my definition, therefore an 'old' idea in a new context has the potential to be part of the creating process, as well as a 'new' idea in a new context.[71]

Idea Generation

From the earliest studies on creativity, idea generation has been regarded as 'the' critical element in the creative process, for without ideas the creating process cannot occur (Guilford 1950, Koestler 1975, Mednick 1962). Interpreted as, 'where do ideas come from?' Idea generation historically has been the heart, soul, and mystery of creativity. The earlier research contributors assumed that by understanding the key, 'the mysterious doors' would be unlocked. In the literature review, an over-arching theory that adequately explains the ideation processes of the mind (mechanisms of the mind) was not found. The literature on idea generation is vast, both in the specialist literature and in general publications. An open Google search returned 10,600,000 entries. A Google Scholar search returned 3,370,000 entries. A more refined Google Scholar search restricted only to the Social Sciences, Arts, and Humanities returned 1,120,000 entries.[72] The vast literature base shows both the effort and the breadth of study expended on the subject. Cziko reached the conclusion that 'the ambitious goal of understanding how the human

[71] There are the complex issues of NIH Syndrome (Not Invented Here!), 'stealing' others ideas, and 'old shop worn ideas' that are outside the scope of these comments.
[72] Searches conducted 23 August 2010.

brain gives rise to intelligent behavior, thought and consciousness remains largely unfulfilled' (Cziko 2000:2).

A premise of the thesis is that we will not be able to come to an understanding of idea generation until we more fully understand the 'mechanisms of the mind' with its billions of neuron and synapse connections. Today, the scientific world does not have adequate tools to accomplish the task, and until they do so, how the mind generates ideas will remain on the frontiers of knowledge in the zone of 'we do not know what is happening quite yet' (Marcus 2004).

Idea Sources in Games

What are the sources of ideas for and within games? Ideas can come from anywhere. As mentioned in the chapter's opening, at the highest contextual level, a leadership decision is taken that a game is required, and a decision is made to start the development process.

Two empirical articles on game development address this question (Hagen 2009, Tschang 2006). In Tschang and Szczypula's (2006) three-part framework (Idea Creation, Constructivism, and Evolution in Games, discussed in Chapter Four), they extensively detailed sources of ideas as:

Idea Creation

- Inspiration (an essential outside idea, or from other games)
- Influences (indirect influence)
- Vision (the really big idea)
- Background (from existing game in development)
- Insight (magic idea)
- Brainstorming

Constructivism

- Based on other games
- Combination (of other's ideas)
- Adaption (from Hollywood script)
- Additive (new game features)

Evolution

- New ideas evolve during development

Other Aspects

- Rational (logical progress of an idea)
- Taking the opposite
- Technology push (technology opens new path) (2006:278-9)

An example of 'Insight (magic idea)' is the source idea for *Pac Man*, one of the all-time great games (Tschang 2006:278).

> magic struck when Toru Iwatani, a programmer for the Japanese amusement company Namco, stared at a pizza with one slice missing ... At any rate, Iwatani took his pizza and, with a bit of role reversal, turned it into a hungry character who just had to eat dots on a screen ... But Iwatani's vision was unique for many reasons. He purposely set out to create a nonviolent game, and a game that would appeal to female players. Though incredibly simple, Pac-Man was the first digital superstar of the video game era, the first character to capture the attention and imagination of the world. (DeMaria and Wilson 2002:62)

Hagen came to a similar conclusion after examining twenty-five Swedish games: 'All the ideas I examined have an origin somewhere outside of the creator's mind. Ideas don't come out of thin air, but from different domains of the human experience and fantasy' (Hagen 2009:10). The larger categories he found were; a) from the game domain, b) from book narratives, the visual arts, and the film domain, c) from the broad range of human activities, such as sport, war and warfare, and d) from human technology and artifacts, covering the range of historical, current, and the process of visioning the future. These externally sourced ideas could apply at various levels, ranging from the overall game concept, to individual pieces in the game, to tiny pieces of furniture in a room.

Ideas can come from anywhere in and around the development team. There is no conceptual difference between ideas from programmers (engineers), artists, and game designers. Alternatively, for that matter, ideas may come from the executive and management side of the organization, or from outside licenses (e.g. film licenses such as *Star Wars*). In fact, some ideas both new and old may be mandated by the organization's marketing arm as now being necessary in all future games based on their assessment of market requirements. Sources of ideas may come from customers where publishers ask for feedback on current games and ideas for future versions, or more immediately, from game testing with outside players during production. Many games have been ‘opened up’ to a select set of players for their feedback on Beta (early) version of games, to solicit ideas as well as acting as a source to find bugs.

In summary, ideas can come from anywhere – they do not come ex nihilo (out of nothing), nor from a special genius source, or any other special sources; ideas can and do come from anywhere stemming from the human experience or human observation.

What more do we know of ideas within games?

Hierarchy of Game Ideas

In the discussions above, ideas are the basic unit of game development. In the early developmental stages the ideas are broad and less defined, and as the development progresses, the ideas become more refined and defined, from the intangible towards the tangible, from the articulation of values to the concrete game aspects.[73]

As Hagen expressed it,

> Game ideas are hierarchical since they can refer to more or less general parts (components) of the game. High-level ideas are about general components, and low-level ideas are about specific components. (2009:3)

[73] This was clearly seen in the Chapter 2 outline of the development planning and execution process.

There is a hierarchy of Ideas developed and approved in the formal development process. No standard industry hierarchy exists as each company and development organization defines it differently, but there is general concurrence on the broad outlines. An example of the hierarchy of game ideas:

Hierarchy of Ideas

High Concept
A very brief summary of the game in one or two sentences that conveys the essence of the game, and what makes the game unique. For example, 'Our game *Future Number One Hit* will combine the best story telling elements of *Existing Hit, Story Telling Game*' with the best fighting elements of *Current Hit, Fighting Game*.' As a written summary, a high concept document would not be more than one or two pages. It is sometimes described as an 'elevator pitch' where an idea is *pitched* in two minutes – the total time for an elevator ride.

Concept or Vision Document
An expanded version of the High Concept, perhaps in fifty to a hundred pages as a maximum.

Detailed Design Document
The design document is a highly detailed description of everything in the game. A reader will know everything about the game. A multi-hundred page document is the norm. Theoretically, it is a blueprint that could be given to any development group, which could then build the game without any further input.

Features
Unique features (i.e., 'running and gunning').
Design ideas (i.e., female hero).
Worlds – environments of suspended belief.

Mechanics
A part of a rule system that defines an interaction. For example, how object trading between players can take place during the game. Alternatively, how a sword fight happens between the hero and the dragon, or a racing car is perceived to go around a race circuit.

Game levels
Game segments completed before moving on to the next segment. It could be a chapter in a story-based game, or a season in a sports game.

Bugs
Errors in the game that run from small aesthetic elements that need to be improved for the overall quality (game balancing), to game failures where software errors crash the game and stop play (technical issues). From one perspective, they could be manifestations of bad ideas. Bugs are reduced to acceptable levels before the game can ship.

Table 11 Hierarchy of Ideas

While it is not critical to specify each possible level of a hierarchy for this discussion, as it will depend on the specifics of individual games and organizations, each game does have a hierarchy. The higher levels require definition earlier in the process to guide development of the lower levels and maintain game integrity, primarily in the pre-production development phase.[74] The integration, collection, or summation of the lower levels is the composition of a higher level.[75]

The significance of this hierarchy is that each level or element is an 'idea' – the basic unit in the development of the creative process – that undergoes a creative process as a part of the CCM and where each idea will have its place on the Creative Continuum as will be described later in the chapter.

Timing

The timing of ideas is critical to the development process. The most important ideas in the idea hierarchy are developed first. The highest hierarchical ideas are followed by the details, for if the former are not 'right' the ideas which follow will be irrelevant. For example, if a competitor is coming to market with his game earlier than yours with a potentially high rating and has better worldwide distribution, the game features and game mechanics are not relevant, however revolutionary. Then, the high concept is just not market competitive. In other words, there must be timely idea presentation and decisions depending on the relative importance of the idea. There is a corollary in that some ideas do not need to be developed early and are developed later in the process – both because they are not needed, and to benefit from the development of other ideas that can, or perhaps must, provide additional context for their development. There is a major exception to the general propositions above. One of the principal aspects of the game

[74] This is in the formal process. Games can be developed around say a great mechanic (special game feature), but all of the other elements of the hierarchy should be defined appropriately and at the correct time for an effective and efficient development process.

[75] While bugs can be treated as ideas, they are not summed into higher levels.

development process is to minimize overall risks. These possible risks may occur in any of the major game disciplines: design, art, or programming. If game ideas contain significant risk, an appropriate strategy is to develop any risky ideas early. For instance, if there is a planned game feature that contains significant risk because of either technical difficulty, or gameplay effectiveness, these are developed early to minimize risk. Addressing risky ideas first may not be the most efficient modus operandi from a production perspective as the ideas are developed out of a more effective sequence, but as a strategy it is more effective from an overall cost perspective. As Ford and Sullivan have suggested 'the primary goals are to learn about the problem, search for useful information, and articulate tentative solutions' (Ford and Sullivan 2004:279). However, to take advantage of new ideas, they have to be developed at the appropriate time depending on their place in the hierarchy of ideas.

Are More Ideas Better?

From early studies of the creativity field, scholars like Mednick (1962), and Guildford (1975) determined that the production and review of a larger range of ideas 'is associated with more creative solutions' (Ford and Gioia 2000:712). The basic premise of 'more is better' has had a very strong influence in many areas of creativity studies (Paulus and Brown 2007, Simonton 1977). For example, Simonton (2004) in a study of research scientists found that those who generated more ideas had more impact on their domains. The underlying assumption has been given great currency in the commercial world with the practice of brainstorming (Osborn 1957, Hargadon 2003).

It may not be necessarily true as a universal premise for all game development phases. In a post-mortem analysis of games software as part of a larger study comparing game development problems with engineering software problems, Petrillo (2009) found the two equally most cited game problems were 'unrealistic or ambitious' scope, and 'feature creep' – that is, starting with too many ideas, and allowing additional features (ideas) to be added during development. These additional ideas either added content or destabilized earlier ideas and decisions. With either problem, it is a question of too many ideas for the appropriate time and budget.[76] In a development context with the constraints of time and budget, there may neither be the time nor energy to process new ideas.

Audia's (2007) study of the constraints of past successes on the generation of new ideas in the disk drive industry, reached a conclusion that departed from the generally accepted 'more is better' premise. In part, Audia examined James March's (1991) concept that organizations may pursue an 'exploration' or 'exploitation' mode in the allocation of resources in organizational learning for generating and exploiting new ideas. The concept is similar to one of the early axioms of creativity studies of two different kinds of thinking – divergent and convergent (Guilford 1950). The former is 'open thinking' to generate ideas (how many ways can a brick be used?), the latter is 'how can an idea be used' (how can we use this brick?) (Runco 2007b). There is an implication of a dichotomy between these two thinking modes; but Runco further suggests that 'divergent thinking and convergent thinking are 'actually two ends of a continuum'(2007b:12) and is supported in this conclusion by Eysenck (2003). Audia's conclusion was that in pursuing March's exploitation mode, which was focusing on incremental ideas that;

> If people's thinking is narrowly focused on the refinement of existing ideas, then more ideas may not necessarily result in more divergent ideas. (Audia and Goncalo 2007:12)

The implications are clear, that 'more ideas the better' should be restricted in application and not a mode of operation that is, or should be, automatically assumed throughout in a production context. A key point to note in the line of reasoning is Runco and Eysenk's

[76] Petrillo's third most cited problem was 'cutting features,' that is, there were too many ideas.

contention of a continuum between the two thinking modes, and then Audia's and March's concepts which highlight the two opposites that become the ends of the continuum. The concept of the idea continuum will be explored in depth later in the chapter.

This section has addressed the concept of ideas, commented on their generation, and suggested that game ideas 'come from anywhere.' The concept of a hierarchy of ideas has been presented, together with the concept that the timing of ideas from the hierarchy is critical in game development. The section closed with a discussion of the concept of 'more is better' and it has been argued that a multitude of ideas is not always the best and only strategy. The following section will address the next step in the chapter schema, the Core Creating Mechanism that underpins the creative process.

The Core Creating Mechanism (CCM)

The literature review discussed Campbell's (Campbell 1960) proposal that the Darwinian evolutionary model could provide insight into the creative process. This section expands on that model relying significantly, but not exclusively, on Dean Simonton's interpretation.[77] It is suggested that the Campbell-Simonton model (BVSR: Blind, Variation, Selection, and Retention) can be developed into a mechanism, the Core Creating Mechanism, which provides significant insight into creative processes. After presenting the Core Creating Mechanism, some significant conceptual differences between the Core Creating Mechanism and the Darwinian BVSR models are discussed. The Core Creating Mechanism is then deconstructed into four variations, or Modes, with the Modes directly relating to creative practice.

[77] Dean Keith Simonton is a major advocate of the BVSR model and has presented cogent arguments for almost twenty years.

Section Three: The Core Creating Mechanism

Evolutionary Approach

The evolutionary view of the creating process is an attractive one (Simonton 1999a, 2007, 2010a, 2010b, Weisberg and Hass 2007). Darwin's basic concepts are well known and academically accepted. 'There is no longer a doubt in any serious mind, and scientists speak, at least informally, of the *fact* of evolution' (Dawkins 2010:18). The Darwinian concept represents a strong base upon which to build an argument.[78] Campbell's (1960) proposal was that the creative process is two-staged; the first is blind-variation (BV) and the second is selective-retention (SR). An essential point in his argument was the concept of 'blindness.' Campbell saw ideational variation (idea as the unit of analysis) as meeting two conditions: first, it is 'independent of the environmental conditions of the occasion of their occurrence' and, second, it is 'uncorrelated with the solution, in that specific correct trials are no more likely to occur at any one point in a series of trials than another, nor than specific incorrect trials' (Campbell 1960:381). Articulating these assumptions differently: first, the ideas are distinct variations upon which selection can work; and, secondly, that the variations are distinctly different in probabilities of occurrence (Dasgupta 2010). There is a very significant distinction between 'blind' and 'random.' The former is open and not influenced by the environment; the latter implies a search through a known 'set' of ideas, or known domain(s). The evolutionary process is blind in the sense that 'it has no foresight, and does not plan for the future' (Lane 2010:2), and it is not reliant on a pre-existing set of ideas. According to Simonton, 'These variations are blind in the sense that the creator has no subjective certainty about whether any particular variant represents progress towards the goal rather than retrogression from or diversion away from the goal' (Simonton

[78] Not all researchers accept that Darwinian theories are applicable to the social sciences. However, a current, extensive and excellent supportive argument can be found in Hodgson, G. M. & T. Knudsen. (2010). *Darwin's Conjecture: The Search for General Principles of Social and Economic Evolution*.

2007:331). Some essential points of the argument are first, the model does not assume that new ideas emerge from the ether (de novo); most ideas are re-combinations of existing ideas, either partially or fully. Second, a large number of ideas is not needed, only that sufficient variation to allow for future development. Third, there may be some boundary conditions that constrain future development and ideas may fall within a certain specific range (Simonton 2007:332). It might be obvious to state, but the evolutionary process is continuous; one gene modification leads to another, one idea leads to another. There are no discontinuous gaps. There may be periods of stability and low change, and there may be interspersed periods of rapid change,[79] but there are no gaps.

A significant aspect of the model is that blind variation can be generated by multiple psychological processes at the individual level; 'conscious and unconscious, systematic and stochastic, voluntary and involuntary,' (Simonton 2010b:190). The model is thus independent of mechanisms of the mind, and the concern is not with how the mind generates ideas, only that there are ideas generated. The model is also independent from group processes that modify ideas.

The Blind Variation generates the 'newness' of ideas. According to Campbell, Selective-Retention is the second step in the creative process. In the same way, as there is a selection of genes in natural evolution, there is also selection of ideas in a commercial game development environment. Individuals make decisions on which new idea to select. The ultimate selection criterion is an assessment of the value added features subject to the development constraints.

[79] Analogous to S. J. Gould's 'punctuated equilibrium' (Gould 1982)

Implicated in the Darwinian model is a continuing process of modification of the organism under the selection pressure of the environment. Over time, the organism is modified by incremental changes to better fit its current environment or ‘adaptive evolution – evolution towards positive improvement’ (Dawkins 2010:18). The selection occurs from the sequence of on-going generations. These generations are ‘iterations’ as the organism moves towards ‘positive improvement.’

In a game development environment, there is both the decision to generate ideas, and there is a selection decision to decide which ideas to execute. Moreover, there is a significant difference from the natural generation and selection ‘in the wild’, because once again decision-making remains a fundamental aspect of the creating process.

The basic BVSR concept is extended by analogy into the Core Creating Mechanism in a game development context, with the very significant differences noted above.

The Core Creating Mechanism

As set out in the previous sections, the creating process starts with ideas. These ideas may be simple, multi-facetted, and complex but ultimately are discrete (e.g., a game concept or a game feature). Ideas in themselves are of no consequence (i.e., they are ethereal and ephemeral) until two further steps have occurred. First, a decision is required to select and move forward into the execution phase, or continue to develop the idea, or abandon the idea. Second, the idea requires execution. Only after execution, can an idea have any value or be valued.

The process uses a mechanism. A mechanism in this case can be defined as follows:

> the dynamic behaviors that occur within a system such as a complex adaptive system. As defined by (Hernes 1998), mechanisms are a "set of interacting parts – an assembly of elements producing an effect not inherent in any of them" (p.74). They are "not so much about 'nuts and bolts' as about 'cogs and wheels' … – the "wheelwork" or agency by which an effect is produced" (Hernes 1998:74). (Uhl-Bien, Marion and McKelvery 2007:304)

The 'cogs and wheels' of the mechanism are Ideation, Decision, Execution, and Iteration applied to game development.

Nickles has suggested:

> The remarkably large domain of application of universal selection theory as articulated by Donald Campbell and others derives from the generality of the BVSR (blind variation plus selective retention) schema. (Nickles 2010:186)

Earlier, he took a very strong position of the universality of the BVSR concept:

> While evolutionary processes are fascinating producers of innovation, I want to defend a stronger claim: they are the *only* truly innovation process that we currently know. (italics in original) (Nickles 2003:55)

And,

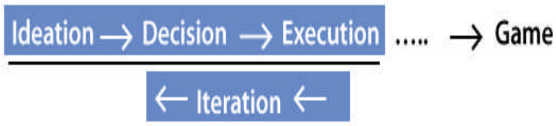
> *Any* system, living or non-living, that combines these three mechanisms (variation, selection, transmission) in the right sort of way, in a reasonably stable environment with selection pressures, will evolve! BVSR is not an intrinsically biological process. (Nickles 2010:187)

Gary Cziko is even more articulate in the application of Darwinian evolutionary theory to other domains. He sees it not as 'a' theory, but *the* Universal Selection Theory, and goes on to say:

> However, as we have now seen, these entities do not have to be restricted to living organisms and the genes they contain. They can be molecules, antibodies, neural synapses, behaviors, scientific theories, technical products, cultural beliefs, words or computer programs. And selection does not have to be restricted to the natural and purposeless selection of Mother Nature, but may involve purposeful human selecting for plants growing bigger tomatoes, cows giving more milk, scientific theories providing better predictions, automobile engines yielding greater efficiency, or molecules providing more powerful drugs. (Cziko 1995:304)

Ideas as used in the fullest hierarchic sense would certainly fall within Cziko's 'entities.' Cziko addresses the earlier described problem of 'purposeful' (decision-making) ideation as against 'blind' variation, and see no contradiction.

For game development, the universal Darwinian model – as a mechanism – and stated as the Core Creating Mechanism (CCM) is:



In the model, the → indicates the flow from idea, to the decision to accept the idea for execution, to execution, and then to the resulting iteration feedback from the results of the execution. The Iteration process proceeds until the game is complete. In the Darwinian model, the selection of the gene is by the environment and the modified gene remains retained. In the Core Creating Mechanism model, the environment is the decision-makers. In either case it is a selection – one is neutral the other is deliberate.[80]

The Core Creating Mechanism can also be seen as a standard information feedback loop where results modify the starting idea. For example, a game designer will have an idea on how to improve the gameplay by changing the main character's interaction with the environment. After discussions with the lead designer, a decision is made to put that feature into the game. The idea is executed as planned, but it may not be fun and interesting enough to include in the game. Various trials or iterations will occur until the idea is accepted into the game, continued iterations occur, or the idea is abandoned.

[80] As will be explored later in this chapter, not all decisions are 'purely' rational; a number of exceptions are noted.

While the Darwinian insight is foundational, the Core Creating Mechanism operates in a range of different ways significantly influencing the creating process. Four variations are presented later in the chapter as lying along a spectrum. It is argued in Chapter Seven (Discussion and Implications) that leaders and managers have a large influence in use of these variations.

Two additional points require elaboration. Ideas are always formed initially at the individual level, and they are open to modification both at the individual and at the group level. The Core Creating Mechanism operates at both the individual and group level. In the model, the perspective described is at the group level without distinguishing the individual's contribution, but of course, groups are collections of individuals. It is very difficult if not impossible to disentangle influences on these different levels of analysis. Further, as noted in the literature review, there are factors that operate both at the level of the individual and at the group level. These factors operate within and on the Core Creating Mechanism, and may enhance or detract from the idea(s) – in the largest sense – and hence game success. It is important to understand that those factors, which influence the creating process, do in fact operate in different ways at different development stages. The theme is further elaborated in Chapter Seven (Discussion and Implications).

Critical BVSR - Core Creating Mechanism Differences

There are a number of significant differences between the Darwinian concept operating in an organizational context and operating in the natural world. These differences are so significant that the concepts need to be viewed as analogous, rather than congruent. First, there is what could be described as a 'goes back/return' mechanism. In the natural world, once a variation is selected and is in the gene pool, there is no way that it can be undone. The gene may have further modification, but incorporated changes cannot be eliminated without the elimination of the host.[81] It is not the case in game development. If an idea does not add value, it can be reversed and the software returned to a prior state, with the possibility of moving along another path or paths. Second, ideas can be iterated until a 'pre-determined' result is obtained, which is not the case in the natural world, as evolution has no foresight.[82] In practice, there is no way to distinguish from 'going back' and iterating because these processes are intermingled in execution. The knowledge obtained from taking these step-backs and step-forwards is retained in the team and is available as ideas for future contexts. An extension of the thought is that in the natural world gene variation is lost with each generation unless transmitted to the next generation. In an organizational context, it is not necessarily true as ideas are retained for future use – knowledge is accumulated as experience. Third, the natural world may be red in tooth and claw (borrowing a phrase from Alfred, Lord Tennyson), but selection is neutral: that is, whatever the influences are in selecting variations, they are simply the effects of the environment at that time. In organizations, these influences are not always neutral and rational. Organizational and industry politics (from minor to major for good or for bad) are always present. Fourth, at the individual and group levels, there is the assumption of behavioural and economic rationality – assumptions that under scrutiny are not always valid (Ariely 2008). Fifth, in the BVSR model the selection is made by the 'neutral' environment, again using the concept that there is no foresight. In the organization, the selection is made with the purpose of anticipating the future result that will add value. It also follows that a decision can be made not to accept the variation and retain the status quo. Last, but not least, the result of organizational efforts is to develop a product that maximizes its value at that time the game goes market. The result of the natural process is maximizing its progeny over the long term. However, in either case of

[81] A geneticist could raise an objection as there are examples of genes being dropped in the evolutionary process. In the larger context of all natural evolution, these are negligible (Lane 2010).
[82] As found in nature in the raw. Selective breeding of animals is targeted breeding with the anticipated or hoped for results pre-planned by the breeder.

BVSR or CCM, the selections are made and ideas retained. In the natural world, there is no control of the process. In a commercial context, there is a large but not absolute degree of control – one way or another, everything derives from the efforts of the leadership and management. Even with these notable exceptions, the Darwinian concept as expressed as a mechanic provides powerful insight into the creating process.

An Implicit Assumption

As mentioned earlier, ideas are ethereal and ephemeral until they are expressed in a form or product that can be judged. There is an implicit assumption in the model that the ideas are communicated to the appropriate decision person or decision function to be judged, evaluated, and put into action as appropriate.[83] Hence, a potentially high-value added idea that remains in an un-communicating mind or a closed notebook does not become part of the creating process. In the idea communicating process, there is always some element of noise and risk of not explaining the idea clearly, and/or the chance of misinterpretation by the decision-makers. The model takes the unrealistic position, just like the economist's rational man, that ideas are clearly communicated for the purposes of the model construction and discussion. They are then followed by the appropriate decision process and correct decisions before being executed. There is always organization noise, or disruption influences on the transmission of ideas within organizations.

Following the chapter schema, the first chapter section discussed ideas, the root of the creating process. After describing the evolutionary approach, the Core Creating Mechanism was presented. The following sections discuss the remaining elements of the Core Creating Mechanism: Decisions, Execution, and Iteration. Part One then concludes

[83] Many researchers define creativity as the generation of ideas only in the mind (Runco 2010), but the interpretation used here is consistent with the definition of creativity in Chapter 2.

with a decomposition of the Core Creating Mechanism into four operating modes as a tool kit for use in the creating process.

Section Four: Decisions

To start, two quotations will bring a little colour and flavour to the discussion.

As Michael Faraday is reputed to have said:

> the world little knows how many of the thoughts and theories which have passed through the mind of the scientific investigator have been crushed in silence and secrecy by his own severe criticism and adverse examinations; that in the most successful instances not a tenth of the suggestions, the hopes, the wishes, the preliminary conclusions have been realized (Beveridge 1957:10)

And,

> Paul Valéry (quoted in Hadamard, 1945, p. 30), the French poet and essayist, may have put it most succinctly: "It take two to invent anything. The one makes up combinations; the other chooses, recognizes what he wishes and what is important to him in the mass of the things which the former has imparted to him." (Simonton 1996:468)

The decision element of the Core Creating Mechanism is simple in concept and yet enormously complex in practice. As a simple construct, a decision is the approval or disapproval of an idea to execute, quite simple and straightforward. Numerous commentators find a great deal of complexity in decision-making. In an organizational context, Mintzberg *et al* (1976) sees a decision as a commitment to a future action. Hastie (2001) has suggested that making decisions has three main elements: courses of action (i.e., alternatives), beliefs about objective states (i.e., including outcome states), and desires (i.e., utilities). Viewed as a complex construct, a decision has an enormous depth and breadth with multiple factors and influences when full circumstances of its environment are considered. The section outlines a viewpoint that describes the decision-making process as an integral and fundamental aspect of the creating process that has been significantly underappreciated in the creativity research domain and in the popular conceptions of creativity.

Much of the research in creativity has focused only on the narrower aspect of idea generation, rather than a broader perspective including a decision-making process. Either from a psychological viewpoint (Simonton 2010a) or organizational viewpoint (Zhou and Shalley 2008), the creativity literature reflects the omission. However, in the past few years there is an awareness of what is now called the 'later stages' in the creative process of idea refinement (Lonergan, Scott and Mumford 2004), idea evaluation (Lubart 2001), and idea selection (Rietzschel, Nijstad and Stroebe 2006, Basadur 1995, 1997).[84] The position in the work is that there is a distinct implementation decision that is fundamental in the creative process. Ideas are the building blocks of the creative process but without the full complex process of decisions – refinement, evaluation, selection, and the unambiguous implementation decision – there are no new and value-added products. Over a lengthy development timetable and with large multi-person teams, there are tens of thousands of ideas generated, and tens of thousands of implementation decisions made. At a minimum, there is one idea and one implementation decision 'attached.' Further, because of the hierarchical management process of approvals in game development, there may be multiple approvals for a single idea. It would appear that decision-making must be as important as idea generation, for one cannot coexist without the other.

The thesis subsumes all the possible complex steps of the decision process – refinement, evaluation, selection, planning and the implementation decision – into a single construct that ultimately is the approval to execute the idea (at whatever hierarchical level). The

[84] Some scholars draw a further distinction of implementation planning steps in the selection of ideas (Byrne et al 2010). As a general rule, experienced operating managers do not approve significant ideas without planning their execution.

multitude of decisions made during game development, including for example timely availability of the appropriate resources, various human factors in all their complexity, the development process itself, and technology factors, which operationally cannot be summed up in a single factor. For purposes of exposition in the following discussion, decision-making is framed as a single point decision that is both the individual selection and implementation decision, but the much larger complexity must be borne in mind. Also, decisions in this framework are made in a profit orientated company culture; other organizations (such as non-profit) may have different factors influencing their decision-making process (Rainey, Ronquillo and Avellaneda 2010).

The purpose of any single decision, and the objective of all decisions, is to make the game more fit for its environment, that is, to accrue more value to the organization. However, as noted later in the chapter, decision-making is not always straightforward and rational.

No Overall Theory

Organizational theorists such as Drucker (1974) and Weick (1995) suggest that organizational decision-making is as much about defining the question as providing an answer. Even before defining the question, there is a need for a decision and to ascertain what the decision is about (Nutt and Wilson 2010c). Every time an idea requires action, there is a requirement for a decision, even if the result is a rejection or decision not to take action. The answer to finding the right question lies firstly in the recognition of ideas and then in their manipulation. These ideas may be old or new to the current context, and may add value or not have value, and the solution may or not be creative, but decision-making is the next essential step from ideas. Articulating the question then is just part of the process.

The domain of decision-making is vast. As in the case of idea generation, a Google search gives an indication of size. An open Google search returned 36,000,000 entries, Google Scholar returned 1,400,000 entries, Google Scholar Business returned 1,320,000, Google Scholar Humanities returned 1,200,000, and a restricted search of Google Scholar Business and Humanities returned 316,000.[85] A current perspective on the decision-making literature is found in the recently published *Handbook on Decision Making* by Paul Nutt and David Wilson (Nutt and Wilson 2010c), two very well respected scholars in the domain. The volume focuses on strategic decision-making, in contrast to understanding how decision-making is 'really made' on a day-to-day basis throughout the organization, and particularly during the life of a specific project. The domain focus on strategic decisions has flowed from Mintzberg *et al* (1976) who saw strategic decision-making as:

> large expensive, and precedent setting producing ambiguity about how to find a solution and uncertainty in the solution's outcomes. Once implemented, a strategic decision stipulates premises that guide operational decisions that follow. A strategic decision is often difficult to reverse once human and financial decisions have been committed to their cause. (Nutt and Wilson 2010a:4)

In addition, these strategic decisions have the following characteristics (Nutt and Wilson 2010a:4):

[85] Search conducted 7 September 2010.

Strategic Decisions

- They are elusive problems that are difficult to define precisely.
- They require an understanding of the problem to find a viable solution.
- They rarely have one best solution, but often a series of possible solutions.
- Questions about trade-offs and priorities appear in the solutions.
- Solution benefits are difficult to assess as to their effectiveness, in part because they lack a clear final end point against which effectiveness can be judged.
- Other problems in the organization are connected to solutions for a focal problem.
- High levels of ambiguity and uncertainty are associated with solutions.
- Realized hoped-for benefits have considerable risk.
- Strategic decisions have competing interests that prompt key players to use political pressure to ensure that a choice aligns with their preferences.

Table 12 Strategic Decision Elements

In reviewing both the definition and characteristics of strategic decisions, they are descriptive of *any* decision made under uncertainty within an organizational context, including during game development. There is a difference in degree only between the executive leadership giving the green light to the multi-million pound project and the game producer making the multiple fundamental gameplay decisions throughout the game's development, or a conceptual artist making his decision on how to proceed with a new piece of artwork. All levels of the organizational hierarchy deal with the same list of decision factors; it is a matter of degree and effect only.

In the *Handbook in Decision Making* mentioned above, Nutt and Wilson come to the conclusion that 'the field has yet to mature … Decision-making research has yet to offer either a coherent description or prescription' (2010b:645).[86] Their search is for a prescriptive action that tells managers *how* to make decisions, which they see as lacking. Thus, currently there has yet to be determined a process or mechanism for decision-making that can be pointed towards enhancing the Core Creating Mechanism process. However, there are certain decision-making aspects that illuminate the Core Creating Mechanism process.

Decision as Part of a Process

As suggested earlier, ideas and decision-making are hierarchical throughout the organization. Within the wide range of creative literature, a number of models describing the creative process are proposed. Mumford and his colleagues (Mumford et al. 1991, Mumford, Peterson and Childs 1999) reviewed these models and identified eight core processes that 'appeared to be involved in most real-world creative-problem efforts: (1) problem construction, (2) information gathering, (3) concept selection, (4) concept combination, (5) idea generation, (6) idea evaluation, (7) implementation planning, and (8) monitoring' (Mumford et al. 2006:78). Hunter went on to say 'There is compelling evidence supporting the model and it is regarded by many as the most clear and comprehensive conceptualization of the creative process' (Hunter, Fredrich and Bedell 2006:30), citing Reiter-Palmon (2006) and Scott (2004). If the creative process model is analysed in terms of decision-making steps, the following emerges:

[86] I have taken this volume as representing a current summary of the thinking in decision-making.

1.	Problem construction	A decision process
2.	Information gathering	A decision process (what information, which source? Integrated into alternatives)
3.	Concept selection	A decision process
4.	Conceptual combination	A decision process
5.	Idea generation	Ideation
6.	Idea evaluation	A decision process (Selection)
7.	Implementation planning	A decision process
8.	Monitoring (of execution)	A decision as to effectiveness

Table 13 The Creative Process as Decision Steps

At every step in the creating process, with the exception of idea generation, there is either a discrete decision or series of decisions.

An alternative perspective is to view the decision-making process as a series of idea evaluations. Are there any significant observations if the decision process is viewed using the decision as the unit of analysis? Poole and his colleagues suggests that the following activities encompass the term decision-making: (1) problem formation, (2) problem analysis, (3) criteria development, (4) solution development, (5) solution evaluation and selection, and (6) implementation planning to describe the process theory of decision-making (Poole and Van De Ven 2010:544). A following stage would be to implement the decision (7), which I have added, as the logical outcome of any set of decisions. The decision model viewed with ideas as content would be:

1.	Problem formation	An ideation process
2.	Problem analysis	An idea analysis
3.	Criteria development	How to evaluate ideas
4.	Solution development	The ideation process
5.	Solution evaluation and selection	Decision
6.	Implementation planning	Part of the decision process
7	Execution	

Table 14 The Decision process as Creative Steps

In step Number 1, as argued earlier, whether problem formation is 'problem finding' or 'solution finding,' it is laying the framework for ideation. Step Number 4, is the generation of ideas, which will then be judged according to the developed criteria.

However, as these two processes are described, each is a mirror of the other in terms of process. The differences are in process segmentations and the units of analyses. Expressing both of the above models in terms of the Core Creating Mechanism, the congruence becomes apparent; that is, the first five stages in the ideation model and the first four stages in the decision model are the same: generation of ideas. The sixth and seventh stages in the ideation model and the fifth and sixth stages in the decision model are the same: decision. The final two stages in both models are Execution. Iteration in both processes is a reflection of what happens in a real-world context. From this, we can see that the creating and decision-making might conceptually be considered as two different processes, but they are inextricably intertwined, if not one integrated process.

Gated Process

In Chapter Three (Video Games and Their Industry), the development process described a number of gated stages where at each stage; approval was required prior to moving onto the next stage. These gated stages are 'decision points' approving the current content and future proposed content, and granting the approval to execute. Earlier gated decisions are concerned with more conceptual ideas; later decisions are more focused on accomplishing the execution of these ideas. Earlier in the chapter, ideas were described in a hierarchy reflecting the various levels of ideas in the game. In the highest conceptual levels ideas were addressed early in development and ideas lower in the hierarchy were sequentially addressed during the game development – and finally down to the final bug. Thus, we are seeing both the creating process and decision process on a sequential and hierarchical basis indistinguishable during game development – or two key aspects of the Core Creating Mechanism in operation.

Gaining Approval

The essence of a gated process is gaining approval (decision) to execute an idea. In concept, the approval for each idea is at the organizational level that is appropriate to its idea in the hierarchy of ideas. From the individual's viewpoint, Csikszentmihályi eloquently expressed it thus:

> For if you cannot persuade the world that you had a creative idea, how do we know that you actually had it? And if you do persuade others, then of course you will be recognized as creative. Therefore it is impossible to separate creativity from persuasion; the two stand or fall together. The impossibility is not only methodological, but epistemological as well, and probably ontological. In other words, if by creativity we need the ability to add something new to the culture, then it is impossible to even think of it as separation from persuasion.(1999:314)[87]

[87] There is an unarticulated implication that the idea is carried through and implemented to influence the culture.

Persuasion can be easy – the idea is accepted automatically if it meets all the appropriate decision criteria – or can be difficult and requires articulate argumentation or selling.[88]

In the assessment of a game idea, the effect it will have on sales via the Metacritic rating is ultimately the most important consideration. If the idea is executed, how many more units will be sold? In obtaining approval for an idea from the relevant decision-maker(s) – one, if not the most important factor, is the previous record of idea effectiveness from a particular individual or group. Where prior ideas have resulted in a 'hit' game, or at the lowest idea hierarchy making significant contributions to gameplay, they are more likely to be approved (Caves 2000, Kelley 2004). In many cases, the idea will have to be 'sold' to the decision-maker(s) to obtain their approval in cases where there are no immediate references and/or the credibility of the individual has yet to be established. In other words, a subjective assessment of an individual's creative ability is required. Elsbach and Kramer (2003) in an analysis of Hollywood pitch meetings, which are conceptually similar to those in the games industry, suggested there were two processes involved. In the first process, the idea-generating individual is assessed using a range of physical and behavioural clues within a set of named mental prototypes (Artist, Showrunner, and Neophyte). These individuals vary from those with high creative potential (but there is a high doubt as to the ability to deliver – the Artist), to the experienced individual who is aware of both creative value and the need to deliver (The Showrunner), and to the new industry individual just learning the industry craft (The Neophyte).[89] The evaluation is an assessment of the individual's creative ideas balanced against the ability to deliver on these ideas. In the second process, Elsbach et al found strong evidence that the decision-makers' 'categorizations of the *relationships* with the pitchers, based on cues from their *own behaviour and self-perceptions,* also influenced their judgements about the pitchers'

[88] This would happen in a 'pure rational' process - there are other alternatives such as the use of power or other Machiavellian tactics in any approval process.
[89] In the case of writers, their full range is Artist, Storyteller, Showrunner, Neophyte, Journeyman, Dealmaker, and Nonwriter.

creative potential' (:294) (Italics are in original, the reference to 'pitchers' is the idea presenting individual). Thus, the decision-maker is asking himself whether he can work with the individual, and significantly, work in a collaborative relationship where his own ideas will be accepted in contributing to the idea-generating individual's ideas. In addition, within a wider context, the decision-maker has to assess if the working team will accept the idea, and furthermore whether the idea-presenting individual can work with the team. Therefore, in summary, the first criterion of idea assessment is the previous record of the individual or group, followed by the evaluation of creativity balanced with the ability to deliver. Additionally, the relationship with the decision-maker and his ability to build a collaborative relationship, with either the decision-maker or the team, is essential. Perhaps put more succinctly, can the individual deliver and work with the team?

The above has presented the decision/approval within a rather simplistic framework of a gated process between the single identity of individual or group and the appropriate hierarchical gatekeepers. Some ideas will require approval from multiple constituencies, both internal and external to the individual or group. Ideas may need to gain the internal approval of the team prior to presentation to the next hierarchal level. External constituencies such as marketing, finance, and overseas territories, may also need to be an integral part of the approval process. Each will reflect different aspects and mix of the creativity-deliverability-relationship factors mentioned above. Some ideas will require negotiation to balance the interests of the other constituencies, either between themselves or with the graces of a third party. If there is a requirement to obtain approval of others in the decision process, for the purposes of this exposition it has been subsumed into the single construct of decision-making.

A rational assumption in the creating/decision-making theory is that ideas are approved by the appropriate levels in the hierarchy. For example, senior technical decision-makers approve core technical decisions. Senior management has the responsibility to see that the decisions are made at the appropriate lower levels; they are not to make the decisions themselves. However, some ideas slip through the gate without being approved. Non-approved ideas may range from ideas that are seemingly unimportant but which are included in the game and yet have high impact in the market (positive or negative), which slip-by because no one is aware of the importance until after the game is in the market, to ideas whose approval is deliberately withheld from the appropriate decision-makers for 'other' reasons. These reasons may be Machiavellian or perhaps there is little regard for the decision-maker's capabilities or the organization's decision-making process.

Constraints

There is an industry saying that all game development is constrained by the Iron Triangle, a triad of three constraints: time, money, and quality (Metacritic rating). All game development in one way or another operates from a fixed resource base; there are always limits to the availability of resources. The Iron Triangle is the context, or the boundary conditions in which game development occurs, the objective of which is to meet the revenue and profit requirements of the organization.[90] What are constraints?

> Constraint is defined as any restriction on freedom that limits the number of possible solutions available for solving the problem at hand, including rules, goals, and limitations on choice, norms, boundaries, and scarcity. Constraint is a continuous construct, with the opposite of constraint being absolute freedom of choice. (Joyce 2009:5)

How do these constraints play a role in the creating process? The widespread popular perception is that creative freedom must be unlimited; the artist must have free space in

[90] This reference is to development process constraints. There are domain constraints, which can be anything from social and cultural taboos, to physical form factors, to market and distribution requirements – the list is large, long, and varied.

which to create the great product. Earlier creativity researchers found that too much constraint on freedom suppressed the creative motivation (Amabile 1983b). Different views have recently emerged from decision-making research that too much choice can be paralyzing, as argued in Schwartz's *Paradox of Choice* (2005), or Sheena Iyengar's *The Art of Choosing* (2010). Chau and Iyengar clearly articulated these arguments as follows:

> the simplistic idea that more choice confers more combinatorial flexibility and thus leads to higher creativity is a limited one. For the most part, it appears that too much choice is actually detrimental to creativity. (Chau and Iyengar 2006:62)

In addition to boundary conditions, some further constraints need to be imposed. Joyce (2009) has suggested that constraints increase creativity both at the ideation and the decision stages. As Stokes articulated 'The evidence supports the argument that constraint selection is critical to generating and sustaining novelty' (2007:107). Google's Marissa Mayer, Vice President of Search Products & User Experience has indicated in her work that establishing constraints increases the innovation in Google's software development and that too much freedom can make the creative process unfocused (Mayer 2006).

In an absolute sense, if there are no decisions then ideas cannot move forward, and without some frame of reference, decisions cannot be made. As was outlined in Chapter Three (Video Games and Their Industry) in the planning process, the overall and detailed constraints of the game are established, be these the Iron Triangle (time, money, and quality), values, or the selected risk tolerance, as appropriate within the idea hierarchy and for the relevant development stage. Constraints are the criteria for the decision-maker to evaluate an idea's newness and value (Boden 1996, Cropley 2006, Csikszentmihalyi 1991). The recognition of constraints is in understanding both, whether *should* an idea be implemented, and whether *can* the idea be implemented – bounded by the Iron Triangle.

Thus, the establishment and knowledge of constraints is an integral part of the decision-making process and the creating process. It is the responsibility of the organization's leadership and management to make the decisions to establish these constraints or see that they are established.[91]

An additional aspect of the decision-making process in evaluating ideas against constraints can be to challenge the constraints; are they both real and appropriate? Constraints can be perceived to exist when in fact they do not exist. That is, there is a greater degree of freedom to act than is apparent. Constraints may be further challenged. In the sense of whether they are correct and appropriate for the task, or whether they can be removed or modified. In addition, there is the corollary where constraints exist and are not known, such as, a technical challenge that cannot possibly be met with the present technology. Thus, an understanding of actual and potential constraints is critical in the decision-making process.

The evaluation of ideas in the decision-making process cannot be done in an absolute sense – will the idea be new and add value to the game? The evaluation is made *in the anticipation* that when implemented the idea will add value to the game. It is only after the idea has been implemented that the evaluation can be made. In the short-term the executives and managers make the evaluation with the team, in the long-term, Metacritic makes it.

Constraints are a fundamental aspect of the decision-process both to measure ideas against approval and as an opportunity to generate new ideas to overcome these

[91] For example, during development when a new idea is proposed, as well as its value, its time and budget constraints also need to be established.

constraints. As mentioned above, it is the responsibility of the organization's leadership to decide the Iron Triangle constraints, and as necessary, other constraints that will ultimately determine how creative any game becomes.

Multiple Criteria

Many decisions are made with multiple criteria, which are not always made around maximizing key features of the game – those of time, cost, or quality. There may be organizational factors whose influences compromise any or all of these factors. For example, a specific game is chosen to develop not because it is the best game for the current market but because the technology developed will further the technology of the whole organization for future games. From the wider long-term perspective of the organization, it is the correct and rational decision to make. It is easier to see at the higher decision levels of the organization but it is suggested that it can occur at all levels when the decision-maker has the knowledge and ability to make this type of decision. For example, a programmer or artist may take the effort to build a tool (a set of reusable code) for his future use incurring additional project cost and time, unbeknownst and against his superior's stated desires. These are choices that both the idea generation and decision hierarchies of an organization are required to make. There is a more familiar way of expressing it – that is balancing short and long-term requirements.

Assumption of Rationality

One of the assumptions of theoretical models is that of rational behaviour on the part of the decision-makers. This is not necessarily true. As mentioned above, there are legitimate reasons for not maximizing all aspects of a current development. However, the underlying rationality assumption is that decisions will be thought through in the correct manner and the decisions made by the appropriate individuals.

The work of Daniel Kahneman and Tversky began to challenge the assumption with their Prospect Theory (1979) of the systemic biases individuals have as decision-makers. These biases included: (a) Framing and loss aversion, where there is more emphasis on losses than gains, (b) Risk seeking, where decision-makers irrationally take risks when the alternative is certain loss or where payoffs are high, (c) Source dependence, where irrational bets are placed because of familiarity with the environment, (d) Escalation of commitment, where decision-makers remain committed to a course of action against increasing evidence of the inappropriateness of the commitment, and (e) Overconfidence, where the decision-makers consistently overestimate their abilities (Certo, Connelly and Tihanyi 2008). Another notable work is that of Janis (1982) on groupthink where group members minimize conflict in reaching decisions without critical analysis, such as, testing for improbable assumptions, or potential problems[92].

Evaluation, Errors, Why Decisions Fail

In addition to the possible irrational aspects of decision-making, errors may occur in the decision process itself. Nutt (1999), based on two decades of studies, argued that half of the major decisions in medium to large organizations failed. One of the principal reasons was the limited search for alternatives and limited idea creation – essential to the creating process.[93] Mumford *et al* (2006) in a study of errors in creative thought, in his creating process model,[94] found there were thirty-five errors with the potential to effect creative thought. These fell into five mechanisms: capacity limitations, reliance on expertise,

[92] I should mention that irrational or less than optimal decision-making was not part of the field research, and no instances were mentioned by the individuals interviewed.

[93] Other principal causes of these failures were managers imposing solutions, and using power to implement the plans.

[94] Mumford's proposed model eight-part creative process model was discussed earlier in this chapter (Mumford 2006a).

over-simplification, over-complication, and over-reaction (i.e., either underestimating or overestimating probable outcomes).

Nutt (2001, 2002) further proposed that decision errors are due to systemic causes that fall into three general classifications, with seven further traps. The three frequently made mistakes are faulty decision-making, premature commitments, and misallocation of resources. Faulty decision-making would include such practices as failure to include all the relevant constituencies in the decision-making process and telling subordinates how to accomplish a task rather than letting them determine the course of action to find the most appropriate solutions. Premature commitment is rushing to judgement rather than developing a wider set of alternatives. Misallocation of resources as an example would include studies to defend a decision previously taken.[95] Nutt's work has focused on large highly visible expensive projects. The causes for decision failure are equally applicable to game development companies.

As elaborated earlier, there is a hierarchy of ideas during game development from concept to bugs. To be useful, any idea must be set into action by a decision process, an integral aspect of any creating process. Decisions are subject to multiple criteria including assumptions of rationality and multiple sources of failure – some of which are systemic. Failures do not occur at the ideation stage, failures occur during the decision phase of Core Creating Mechanism operation, and during execution. Failures are equally applicable to ideas at whatever level. There may be differing conditions that surround the decisions and their impact but all ideas are subject to some degree of failure in the creating process.

[95] Nutt's summarizes the 'traps' which organizations need to avoid are as follows: failing to take charge by reconciling claims, ignoring barriers to action, ambiguous directions, limited search, misusing evaluation, overlooking ethical questions, and failing to learn.

Although not directly part of the creating process but influencing it, decisions are subject to iteration. Decisions can be changed as more consideration thought is put into them, or as new facts become available, among other reasons. The availability of new facts can constitute a change in project constraints – a competitor's new game has changed the market requirements, or the planned budget is reduced (and rarely increased). Changing decisions will affect the creating process, from idea selection, through to execution.

The Decision Continuum, Risk, Ambiguity, and Uncertainty

Are decisions lying along a continuum, and if so, does this assist in understanding the creating process? If there is a continuum, what is it a continuum of? Frank Knight (1921) significantly made the distinction between 'risk' and 'uncertainty.' Runde (1998) articulated these positions as:

> 1. *Situations of Risk.* Situations in which the decision maker assigns probabilities to events on the basis of 'known chances' are defined as numerical proportions of otherwise (in some sense and some degree) homogeneous *xs* that are also *ys*; and
>
> 2. *Situations of Uncertainty.* Situations in which the decision-maker is unable to assign probabilities to events because it is not possible to calculate chances (where there are insufficient xs homogeneous enough to form classes within which the proportion of *xs* that are also *ys* can be determined. (Runde 1998:540)

In situations of Risk there are known outcomes when expressed on a graph where the x is known (or at least estimated with some degree of accuracy), and the y is determined. In situations of Uncertainty, there is no known outcome, as knowing x will not give a y answer. Runde's interpretation of Knight's dichotomy is that 'he seems to be thinking in terms of a *continuum* of probability situations, depending on the homogeneity of the 'instances' in question' (Runde 1998:541). The meaning of instances is 'trials' that result in an 'outcome.' In other words, given there is a homogeneity of the content that the decision-maker is addressing, then there is a continuously decreasing probability from a known to unknown outcomes, or as Runde suggests ‘that the differences between the … kinds of probability situations are a matter of degree rather than of kind’ (Runde 1998:542). Taylor expresses the continuum in an interesting and slightly different way when discussing risk and uncertainty:

> The topology between these two precisely defined extremes is blurred at best and filled with epistemological gaps at worst. In the terminology of fuzzy set theory (Zadeh 1978), there is a spectrum of increasing fuzziness as we move toward pure uncertainty. (2003:253)

Fuzzy set theory allows the gradual assessment of contents of a continuum as a series of sets, leading, as in this case to the gradual assessment of all sets along the risk continuum.

A continuum will start from a position of certainty where the outcome and probability of a decision is known (or estimated with some degree of accuracy). Moving along the continuum is increasing risk, with an increasing number of outcomes the results of which are becoming less known. At the other end of the continuum is uncertainty, where both the possibilities and the outcome are unknown.[96] Dequech (2003) proposes there is a further segmentation between risk and uncertainty which he calls ambiguity based on degrees of information of outcomes and risks. The decision continuum is a series of segments of certainty, risk, ambiguity, to uncertainty. At uncertainty, Dequech sees:

> situations of fundamental uncertainty are essentially characterized by the possibility of creativity and structural change, and therefore by significant indeterminacy of the future. The list of possible events or states is *not predetermined.* This means that some of the relevant information *cannot be known, not even in principle,* at the time of making many important decisions. (italics in original) (Dequech 2003:520)

[96] For example: using a well established format for a racing game with a license, marketing is able to forecast with a high reliability sales of x,000,000’s of units. Developing a racing game with a new structure not previously seen in games and no license, marketing ability to forecast sales diminishes significantly.

The way that Dequech describes it is very close to a key distinction that Campbell and Simonton made that blind variation is independent and indeterminate.

Earlier it was suggested that the decision and ideation processes are mirror images of each other. In the ideation process, the unit of content (or unit of analysis) is the idea, with a series of decisions made to arrive at an outcome. In the decision process, again the content is the idea (as the unit of analysis) with the manipulation being the processing of the idea through the various decision stages to the outcome. In other words, ideas are the content and decisions are the process that leads to outcomes; the two are inextricably linked. Formal decision theory suggests that outcomes lie along a certainty-risk-ambiguity-uncertainty continuum. It is proposed later in the chapter that the outcomes of the creating process also lie along a continuum – The Creative Continuum, and that the characteristics of the risk-ambiguity-uncertainty profile directly maps to the continuum.

The last two elements of the Core Creating Mechanism remaining to be discussed are Execution and Iteration.

Section Five: Execution

An essential element of the Core Creating Mechanism is Execution – the completion of the idea within its hierarchical level. From a theoretical perspective, I have argued that only when an idea is executed can it be judged and its value-added realized. As shown in Chapter Three (Video Games and Their Industry), the largest proportion of production labour-months is absorbed in the Production of the game. All necessary building blocks must be available for execution to succeed. As a founder of Pixar, Ed Catmull expressed it ‘If you give a good idea to a mediocre group, they’ll screw it up. If you give a mediocre idea to a good group, they'll fix it' (Catmull 2007). It cannot be overstated that having the appropriate resources and the ability to execute underlies the creating process.[97]

There is a common expression that 'ideas are cheap' or as West articulates it 'Ideas are Ten a Penny' (2002a) arguing that:

> that understanding the factors that promote creativity in teams in applied settings is less urgent than understanding the factors that promote the implementation of ideas into practice … Generating creative ideas in a group is relatively easy; implementing new products, processes, or procedures in work organizations is difficult. (West 2002a:411)

It is not an 'either/or' proposition of which is most significant, understanding only the factors that influence ideation or understanding only the factors that influence execution. Both are necessary and are contextually bound together, and play an integral part in the creating process. The decision-making process binds ideas and execution together. Execution can be enormously hard: difficult to deliver the vision of the game, and difficult to deliver on time and on budget, difficult to achieve the required quality level (Metacritic rating). This fact has been somewhat under emphasised in this thesis, but it implicit in my preceding discussion of decision-making.

Section Six: Iteration

Iteration is the repeated operation of a process, with the introduction of some variation, to achieve a successively closer approximation to a problem solution or desired result. Inventors repeatedly striving to solve problems are part of our wider culture. Two examples are; 1) James Dyson had a reputed 5,000 prototypes developed before making his Cyclone vacuum cleaner, and 2) Thomas Edison's thousands of trials to find the right

[97] However of immense importance, game execution was not part of the field research. Many games fail both creatively and financially because of the inability to execute - to quote an old English proverb 'There's many a slip twixt the cup and the lip.'

filament for the incandescent light bulb. Research has found that iteration is fundamental to the creating process. Shalley and Zhou see iterations as a fundamental aspect of creativity:

> Also, it is an iterative process, involving reflection and action, seeking feedback, experimenting, and discussing new ways to do things in contrast to just relying on habit or automatic behavior (2008b:4)

Anderson et al are very articulate in seeing iteration 'unequivocally' in organizational innovation:

> First, important advances have been made in our understanding of *innovation processes* in organizations. Several general models of the innovation process have been proposed at differing levels of analysis (most notably, Damanpour and Gopalakrishnan, 2001; Rogers 1983; Schroeder et al., 1989; Van de Ven et al., 1999; West 1990, 2002[b]; Zaltman et al., 1973) and have received some validation from longitudinal observation studies (e.g., King 1992; Van de Ven et al., 1999). This research confirms unequivocally that innovation processes in organizations are iterative, non-linear (that is, the sequence of events cannot easily be portrayed as a neat, step-by-step unfolding series of phases), disjunctive, cyclical … (Anderson, De Dreu and Nijstad 2004:152)

Within the Darwinian and CCM frameworks, iteration is the introduction of new ideas, or variations of an existing idea, or the recycling of old ideas with some variation. The subsequent decision and execution drive the creating process. In natural selection, the more variation, and iteration, ultimately the better the fit there is between the organism and its environment. The same is true in game development. The more iteration the better, subject only to the project's constraints. Each iteration contains the possibility of new knowledge that may or may not be valuable, but eventually iteration ceases. It ceases with the decision that additional iteration does not add sufficient or proportionate value to the development. Alternatively, the knowledge obtained may not be directly useful in the current project, but has the possibility of adding value in some another development thus adding to the organization's knowledge base. Unlike iteration and variation in the natural world, iteration in the commercial world is expensive and therefore must be controlled.

In everyday language, we are aware of iteration, calling it feedback.[98] It is not restricted in the sense of feedback to individuals, but also in the wider sense of an information response returning to the source. Feedback allows a team to see what they could not have seen previously. Weick captured it beautifully in his well-known phrase 'how can I know what I think until I see what I say'(Weick, Sutcliffe and Obstfeld 2005:412); or in the case of game development, how can I really know what the idea is until it is up on the screen and playable. From a wider angle, Wildavsky (1979) points out that people do not know what they want until they see what they can get. When an action or execution occurs then feedback has an impact on and adjusts the idea, product, or process to provide some element of change. From Weick's sense-making perspective this is 'about the interplay of action and interpretation rather than the influence of evaluation on choice' (Weick et al. 2005:410). Because game development is working in a relatively changeable medium (i.e., in many aspects, software is easy to change), it may not be an exaggeration to say that from the start of the planning process, through to the first prototype, through to gameplay testing, through to the elimination of the final bug, the development process consists of constant feedback. We commonly say that 'we are learning from our mistakes,' which is just another way of expressing feedback and iteration. Whatever the cause of the mistake, be it the wrong conclusion reached with incorrect interpretation of the known facts, or as the result of 'hazarding a guess' because of lack of knowledge, the learning process as a process, is iteration. Mistakes as 'trial and error' are just another way of iterating (Sitkin 1992). Whether it is labelled feedback, or

[98] In other contexts, it is referred to as; experiments in science practice in sports, rehearsal in theatre, multiple takes in film. There are many other examples in other domains.

learning from mistakes, the question becomes 'is the idea working, or should it be modified?' If subsequently modified, iteration has occurred. Feedback is not necessarily always negative – positive feedback can show better results than have been seen before.

One caveat requires mentioning – not all iteration is creative. A non-creative iteration, may just add value to the game. A creative iteration will meet the requirements of new and value-added. An iteration that only increases the production values, like a better piece of art, may make the game look better, but it does not fall under the rubric of creative.[99]

So far, this chapter has discussed the Core Creating Mechanism and its elements of ideation, decision, execution, and iteration. The discussion now turns to an analysis of the Core Creating Mechanism as a working mechanism.

Section Seven: The Four Operating Modes of the Core Creating Mechanism

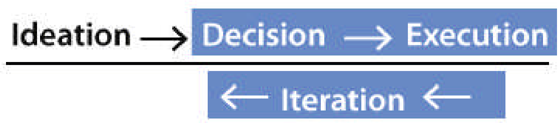
The analogies used earlier saw a mechanism as a dynamic system of interacting parts that behaved as a structure of cogs and wheels. As Darwin's BVSR mechanism works in the natural world, the Core Creating Mechanism works in an organizational context. BVSR works as a single mechanism where there is only variation, selection, and retention in an on-going process. The Core Creating Mechanism can operate in a range of different modes. While presented below as four individual and discrete modes, this is a heuristic device to illustrate the relative differences in the combination of elements.[100] From one Mode to another, the elements change in relevance along a spectrum, that I call the Creative Spectrum. What is significant is that these modes can be used at the discretion of

[99] This was mentioned in the earlier example where only the polygon count of a figure is increased.
[100] Or in a more formal sense, the modes can be considered as different sets of Zadeh's (1978) fuzzy logic.

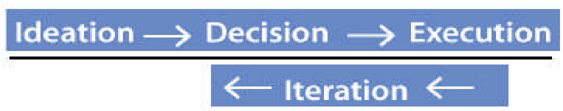
individuals in the organization. In other words, the creating process itself is subject to the individual's or group's control of the choice of mode in which to operate. Conceptually, there is no difference between a single individual and a group choosing in which mode to engage in the creating process. The individual modes are the specific operation of Ideation, Decision, Execution, and Iteration in different combinations that produce different results. Because iteration is an integral element of the Core Creating Mechanism, the various modes may be described as loops, or a looping process. The four modes are identified and then discussed individually.

1. **<u>The Idea Mode:</u>**

2. **<u>The Execution to Target Mode:</u>**



3. **<u>The Creating Mode:</u>**



4. **<u>The Serendipity Mode:</u>**

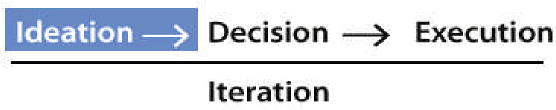
The different modes are not discrete but are along a spectrum or a line, and are a description in the ways in which the creating elements are manipulated. To the left end of the Creative Spectrum, the emphasis is on the manipulation of ideas. In the Spectrum's centre, there is a balance between ideation and execution. Towards the right end of the Spectrum, the emphasis is on execution. The first modes (Ideas) with the focus on ideation cannot be considered creative, since there is no execution and nothing to evaluate for value. The central two Modes, Mode 2 (Execution to Target), and Mode 3 (Creating Mode) have engaged all four elements and may be considered the essence of the creating process. In the remaining Mode 4 (Serendipity), the emphasis is on execution. There is no single optimum mode for the entire creating process. An individual or group, can and will move from using one mode to another as production requirements dictate during any stage in the development process.

There are two additional conditions to consider, ideation alone and execution alone, which would lie at the two ends of the Creative Spectrum. Ideation alone would be the existence of an idea without any reference, and as mentioned earlier, ideas alone are ephemeral and by themselves are of no value. At the other end of the Creative Spectrum is pure execution, but there is no guarantee that a serendipitous (accidental) idea will either be new or add value. Thus, the two ends bind the Spectrum's centre where the four creating elements interact, and the ends fade into creative irrelevance, delivering neither newness nor value.

The use of the individual modes is situational in that each is best for a particular task. Individual 'factors' such as the amount of resources available will influence the creative effectiveness of each mode. A shorthand way of envisioning these modes would be as a tool kit – variable in that the mix of the individual elements changes depending on the task. Sometimes a single tool is used throughout a creating process, sometimes multiple tools are used in sequence, and sometimes there is a constant mixing of tools. An example is a surgeon using a specific instrument during an operation, or a sequence of instruments throughout, or constantly switching between all his instruments throughout the operation. Any instrument comes in all sizes, from the fine and delicate to the robust. The decision is the surgeon's on the tools he uses, when, and how he will use them. There is no implication of impact of newness or value using these tools. Tools are neutral. There are better and poorer tools for accomplishing any task. It is the decision-maker's choice on which tool to use for the specific context in which he wants to make a creative contribution, and the results of his efforts then become available for judgement.

A fuller description of each mode now follows.

1. **The Idea Mode:**



The operation of Mode 1(Ideas) only concerns ideas. Off the end of the Spectrum would be the mass of ideas that have no relevance to the production task. Then, so to speak, moving onto the Spectrum would be the active search for a relevant idea, beginning with an unbounded search (unrestricted domains, blind) and progressing towards a bounded (restricted, random) search for the relevant idea. A general description would start with an openness of ideas or divergence from current thinking, mind-sets, or paradigms. Subject to constraints of time, cost, and other context constraints, the more ideas there are to select from, the better the possible results, subject to the qualification mentioned above.

Then next along the Spectrum would be the integration of ideas in an active manner. In an organizational group setting, it is the familiar brainstorming of Osborn (1957) with his rules of 'no criticism,' 'quantity is the goal,' 'combine and improve as much as possible,' and ‘all ideas are to be articulated and noted no matter how wild.’ With guidelines on implementation, Paulus has suggested that under the right conditions brainstorming for ideas, or ‘idea exchange process in groups’ may be ‘an important means for enhancing creativity and innovation in organizations’ (2000). At the same time, he has also found that there are some significant inhibitory social and cognitive factors in the brainstorming procedure, but under ’certain conditions’ it is ‘quite effective’ (Paulus and Brown 2007:248). From large quantities of ideas, ‘newer’ ideas, and ‘newer’ ways of thinking are brought out for further development, meshing together in new combinations to create different ideas – one of the foundational thoughts in early creativity research (Mednick 1962). Alternatively, new ideas will assist in the restructuring of problems opening up additional paths to solutions.

Sutton and Hargadon’s study of IDEO, a major US design firm in Silicon Valley found that a central dynamic in that company’s design process was brainstorming. Apart from being central and an effective development process, the research discovered ‘important consequences’ not seen before in brainstorming literature. These were:

> (1) supporting the organizational memory of design solutions; (2) providing skill variety for designers; (3) supporting an attitude of wisdom (acting with knowledge while doubting what one knows); (4) creating a status auction (a competition for status based on technical skill); (5) impressing clients; and (6) providing income for the firm.
> (Sutton and Hargadon 1996:685)

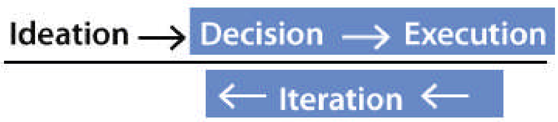
The significance of these findings is that not only was brainstorming directly effective in idea generation but there were significant additional contributions to the organization.

After generating and perhaps combining ideas, the next step is evaluation – the decision to action the idea, or to continue to iterate the idea(s) for further progress. The process can range from a simple ranking of a set of ideas, through multiple iterations through to the refinement of a single idea. The process is an example of planning (complete iteration to the required objective and detail) where the iteration of ideas continues towards a point where the decision is then made to move into execution. Ideas are measured against constraints, with future results anticipated from execution. The Pre-Production phase of development as seen in Chapter Three (Video Games and Their Industry), is an example. Although not usually viewed within this framework, this is a description of any negotiation process where parties work ideas and their own individual set of constraints to arrive at optimum solutions.[101]

Any time in the development or production phase when ideas are iterated repeatedly – be it planning, or problem solving, where ideas are iterated – the organizations is said to be working in this mode.

The Idea Mode is a prelude to action and execution.

2. **<u>The Execution to Target Mode:</u>**



In this Mode, the ultimate object has been determined, but the path to reach the goal is unknown. There are varying degrees of knowledge as to the nature of any target. Watson and Crick knew exactly what they were after in their quest for the structure of the DNA molecule. There is a very specific structure of the molecule, but exactly what that structure was, was unknown. They knew they had achieved their objective when all the pieces of the puzzle had come together. Edison in his pursuit of the incandescent light bulb filament knew what the overall objective was, but not the exact nature of the solution. He, too, knew when he had achieved his objective after multiple, reputedly

[101] Based on my own field experience, considerable negotiations will occur at the gate points described in Chapter 3. Significantly so during the pre-planning, but can occur at any of the gate points.

thousands, of trials that his objective had been met. The required results are known, but the process and steps on how to get there are unknown. The path or paths to reach the unknown consist of decisions, executions, and iterations.

In a *Life* magazine cover story (Callahan 1972), Edwin Land related how the creating process started for the development of his instant camera (what became the Polaroid camera). He had taken the last picture on the camera's roll of film and had to tell his daughter that they would see the picture after development in about a week's time. Her frustrating reply was 'Why do I have to wait a week to see my picture?' It was the challenging spark that led, after four years, to the instant camera (Basadur and Gelade 2003). Land knew his ultimate objective in advance, but when starting, did not know how to reach that goal.

The central driver in the mode is actualizing the pre-determined idea into a concrete reality. The process is the iteration towards that reality. Other modes may be engaged in further ideation and iteration, but the difference here is in the presumed certainty of the objective. The difference is not absolute, but of degree, along the Spectrum. The conundrum in the mode is choosing/determining the targeted idea. This conundrum, of course, is one of the major questions that have bedevilled understanding of the creating process. Although not restricted to the Execution to Target mode, articulating the problem clearly (as a target idea) is the necessary precursor to starting in this mode. For example, the idea is structured, as 'The problem is to solve the structure of the DNA molecule.'[102] Execution and iteration then follow as the method of executing to the target idea.

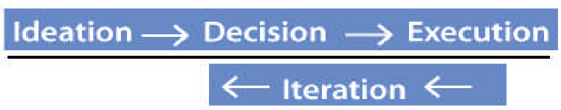
[102] Another way this is articulated is in terms of finding the right problem and/or asking the right question.

Just as Watson and Crick had sufficient contextual knowledge of their domain(s) to know where the limits of knowledge were and decide what target idea to pursue, in the same manner, game industry decision-makers rely on their industry knowledge and experience in knowing the directions towards which their games should be directed. The major ideas 'targeted' are defined in the pre-production documents in the High Concept and Vision documents. Then, as the planning evolves, the intermediate targets are the milestones, and so the process further progresses down the hierarchy of ideas.

Although not thought of as involving any creative process, reverse engineering is starting with the product and working back to the idea. Although not necessarily restricted to the mode, in any mode which generates a product, the CCM can be run backwards to arrive at the idea. Starting at the end and going to the beginning, as an 'operation' is not restricted only to final products. Karl Weick in his work on organizational sense-making behaviour proposed the model of 'enactment → selection → retention' (Weick 2001). The content of his model is organizational understanding (or ideas) as the unit of analysis. In which case, the model would look like Execution → Decision → Idea as the process works backwards to understanding.

The next stage along the Spectrum is to add ideas in an open-ended manner and the introduction of multiple iterations, leading to the Core Creating Mode.

3. <u>The Creating Mode:</u>



The Creating Mode (CM) is the heart of the creating process engaging all four elements: Ideation, Decision, Execution, and Iteration. Variation is introduced into the creating process as the introduction of new ideas, the combination of ideas both old and new, and the continued refinement of an existing idea. It is a looping or cycling process that continues until the idea execution is complete. Alternatively, putting it in evolutionary terms, the idea through variation has reached the necessary adaptive state required to survive, or survive more successfully, in its environment.

The production of prototypes is an example of the iterating process. A prototype is an early expression of an idea with the purpose of testing the idea, and making modifications as necessary. The function of the prototype is to test against constraints. These constraints can vary from 'can we actually build the idea' to 'what is the player reaction?' With the introduction of variation, the prototype results are new. The new results lead to new viewpoints that open up idea opportunities that could not have been foreseen without the experience of the prototype. They are hilltops that provide visibility into the valley below and the tops of the further hills – the opportunity to see further along the creating process than previously. Carlson and Wilmot (2006) have argued that in the innovation process the more iterations the better, and that iterations are on an exponential improvement curve with each iteration incrementally adding value. Of course, the prototype process does not continue forever as the process has ultimate constraints of its own of time and value received for each new increment.[103]

As was discussed in Chapter Four (Literature Review), Tschang and Szczypula (2006) proposed that game development was composed of three elements: (a) creative ideas, (b) the concept of constructivism, or the combination of ideas and, (c) the evolution of the game during development with the introduction of new ideas. These three concepts are a

[103] Prototypes are not necessarily a version of the final idea. They can be inelegantly thrown together to act as a test of viability. The resulting knowledge following an iteration and execution is included as appropriate in the final game.

compressed version of the Core Creating Mechanism. The progression of new ideas drives the evolution of the game and brings it into reality. As mentioned earlier, the introduction of new ideas must be appropriate to the hierarchical and timing requirements.

Robert Weisberg in his discussion on the prominent myths of creativity provides a detailed analysis of the creating process of *Guernica*, one of the most significant artworks of the last century (Weisberg 2006:34-51). Picasso left a record of the process in a series of forty-five dated and numbered preliminary sketches, as he felt that historically people might be interested in how the painting design progressed. Weisberg explains how the core idea for the painting was based on an earlier painting *Minotauromachy.* Weisberg summarizes the process:

> Picasso spent the bulk of his early time working on the overall structure of the painting and the main character, and then moved on to other aspects of the painting. Thus, analysis of the temporal pattern in the whole of the sketches indicates that Picasso was systematic in working out the structure of *Guernica*, and that he had it more or less completed before he went on to the specifics of the painting. (2006:42)

One way to describe the sketches is as mini-prototypes. Another way to describe the sketches is as iterations, with the addition, subtraction, modification of ideas through the various conceptual states. With each of the iterations, Picasso was making decisions about how to modify the current sketch as a prelude to a further stage in the development process. Each of the four elements of the creating process can be seen working in an integrated manner.

There are occasions when either knowledge is incomplete or conditions of the environment are unknown or unstable. A different idea mode is then required leading to the execution end of the Creative Spectrum.

4. The Serendipity Mode:

The central driver in the mode is 'action solves problems' – doing something, anything – will derive some knowledge that can be used to move forward.[104] The mode is most effective in conditions where there is lack of knowledge, very unstable environments, or conditions where deep complexity exists. Many natural organisms handle unstable conditions by generating large numbers of progeny with slight variations, some of which, find and exploit niches in the environment (Johnson 2010:106, Kauffmann 2000). The central idea of the mode is to generate alternative outcomes and see if one of them 'works.'

Mintzberg and Westley suggested three decision-making forms leading to action: 'seeing first,' 'thinking first,' and 'doing first.' As suggested earlier, there is a large degree of congruence between the creating process and decision process. From a process perspective, these are three creating modes. Their 'thinking first' are variations in expression of Modes 1 (Ideas), while their 'seeing first' has more in common with Mode 2 (Execution to target), where the target is already 'seen.' The essence of Mode 6 (Serendipity) was captured when they suggested:

> But what happens when you don't see it and can't think it up? Just do it. That is how pragmatic people function when stymied: They get on with it, believing that if they do "something," the necessary thinking could follow. It's experimentation – trying something so that you can learn … That means doing various things, finding out which among them works, making sense of that and repeating the successful behaviors while discarding the rest. Successful people know that when they are stuck, they must experiment. Thinking may drive doing, but doing just as surely drives

[104] A very crude colloquial expression of the mode is 'throwing spaghetti against the wall and see what sticks' or with slightly more finesse 'suck it and see what happens,' the 'it' in the latter case being a sour lemon. At the highest levels in the hierarchy of Ideas, this is not done with the high cost levels involved.

> thinking. We don’t just think in order to act, we act in order to think. (Mintzberg and Westley 2001:91)

The mode could also be described as searching-by-action in order to find a creative outcome. The active search can be random (in a limited defined search space) or a blind search (in an unlimited search space). In the later, the results are blind in the Campbell/Simonton sense with the results independent of the initial conditions. Positive outcomes are accidental in not being planned, they could be said to fall under the rubric of serendipity. Serendipity is defined as ‘The faculty of making happy and unexpected discoveries by accident’ (OED). Serendipity can range from active to passive in energy. Deliberately creating the opportunity for results and making decisions regarding those results would be active serendipity. Whereas passive serendipity occurs when an idea ‘completely falls from the sky.’

Within a somewhat different framework, a wonderful expression of serendipity is from Bandura:

> some of the most important determinants of life paths often arise through the most trivial of circumstances. Although the separate chains of events in a chance encounter have their own causal determinates, their intersection occurs fortuitously, rather than through deliberate plan. (1982:749)

The four creating modes can be visualized in a chart or Creative Spectrum below.

The figure illustrates the Creative Spectrum as a U-shaped curve. At the top left, ideas begin to fade in. Moving towards the bottom centre, all elements of the Core Creative Mechanism are engaged. The curve then rises to the right as execution becomes more prominent, and fades at the top right corner. The Spectrum is continuous from Ideation

alone at one end, to Execution alone at the other end. The vertical axis represents increasing uncertainty of outcome, as there is a higher probability of an outcome (execution) at the Spectrum's centre and no known outcomes at either end of the Spectrum. The Spectrum ends diverge from, and conversely converge towards the centre, bringing to mind March's (1991) conception of an organization's exploration and exploitation activities and the convergent-divergent paradigms in classic creativity theory (Weisberg 2006:453, Runco 2007b:10). The four operating Modes are represented as points along the Spectrum. The curve only represents the operating of the Core Creating Mechanism – it does not indicate that either of the two creative requirements of value-added or new are in any way met.

<u>The Creative Spectrum</u>

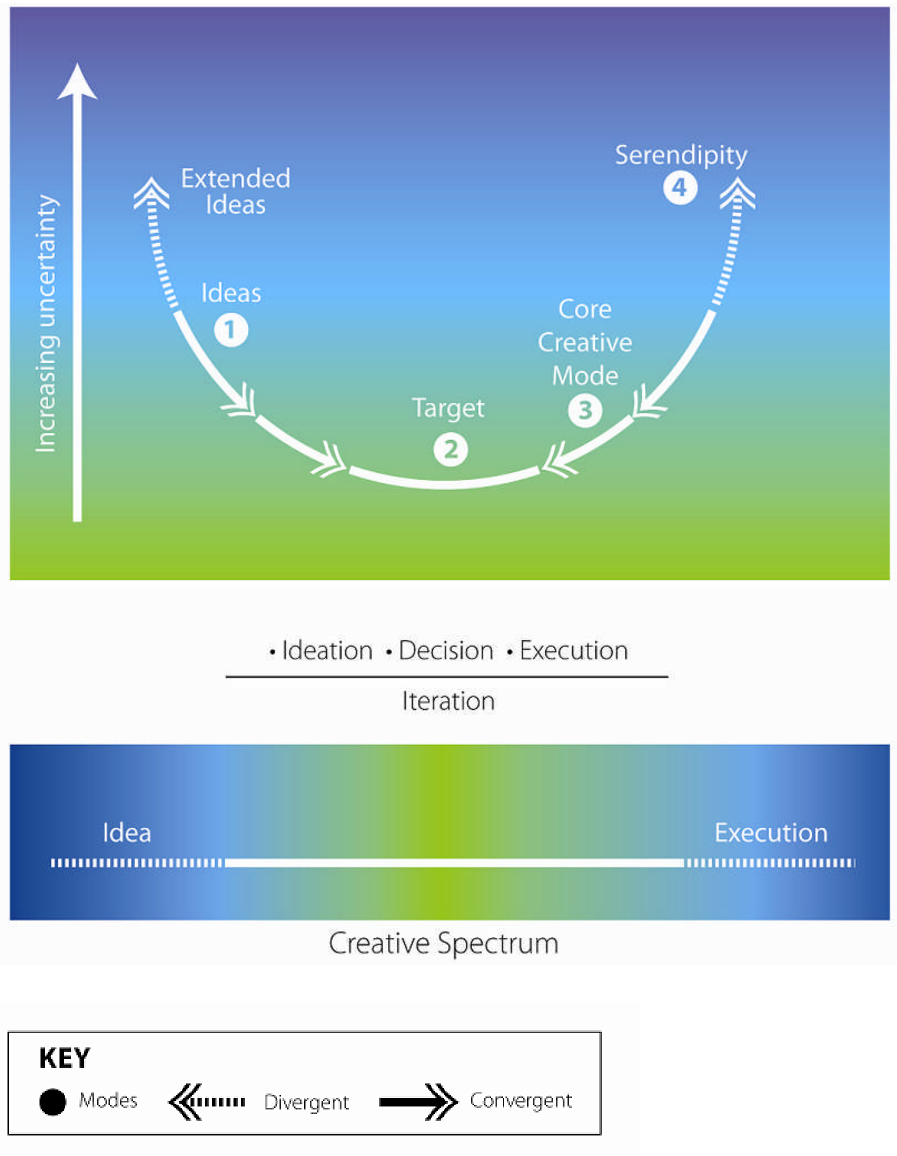


Figure 2 The Creative Spectrum

The movement away from the centre of the Spectrum along the two arms increases uncertainty, but there is no means of either stating or measuring any level of uncertainty of outcome. Regarding the tool analogy mentioned earlier, certain tools are better for certain tasks. The use of the tools is dynamic however, and can move from one mode to another, and back as necessary. For example, an idea may be developed in Mode 1 (Ideas) in brainstorming, and the process then moves to use Mode 3 (Creating Mode) to better define the product-idea through numerous iterations. The final product is completed in Mode 2 (Target Mode). The use of a specific tool is situational depending on several things, current requirements, the tool user's skill, and experience in using that tool, the resources available, and the stability of the environment.

Knowledge of the domain reduces uncertainty. As Nickles pointed out, the less you know of a domain, 'the weaker and less constrained (hence more blind) the search procedures are available to us. (Nickles 2003:63):

> you graduate to a stronger form of inquiry…. In general, the more domain knowledge available, the more constrained or 'biased' the variation and selection mechanisms can be. (Nickles 2003:70)

In other words, the preference is more towards the use of Modes 2 (Target) and Mode 3 (Creating Mode). The use of Mode 3 (Creating Mode) has, in general, the potential to be more effective in reaching better outcomes. Each iteration should improve knowledge, quality, and certainty of the outcome. The more domain knowledge there is, the more the mechanism's usage moves towards the Spectrum's centre. The less domain knowledge – either absolute or resulting from an unstable environment – the more the mechanism usage moves towards the Spectrum's ends. However, development groups are not costless environments; therefore, the preferred operating mode is towards the Idea end of the Spectrum whenever possible. Thinking is generally less expensive than doing.[105] Planning, as thinking, is less expensive than iterating.

The art and science – or experience – in using the individual modes is the essence of the creating process. Those decisions lie in the hands of the individuals, their managers, and their leaders who are most able to judge the effectiveness against the costs, given knowledge of the domain and its stability conditions.

Summary of Part One

The chapter presents two models that collectively describe and illustrate the creating process. In Part One, the first model – the Core Creating Mechanism (CCM) – has discussed how the four elements of Ideation, Decision, Execution, and Iteration, when bound together in differing combinations produce differing results. As a heuristic device, the combinations were presented as four modes along a continuous spectrum that creative decision-makers might use as tools to achieve specific results. The Core Creating Mechanism was developed using a Darwinian framework as an analogy for a mechanism with the 'idea' as the basic unit of analysis – similar to the Darwinian gene. The model brought into the foreground the essential nature of the decision-making process to the Core Creating Mechanism, and elaborated how aspects of the decision process were deeply embedded into the creating process. The fundamentals of gated processes, gaining approval, constraints as the decision criteria, multiple criteria, the assumption of rationality, and decision errors were considered. The decision continuum with the range of risk, ambiguity, and uncertainty maps to the Creative Spectrum.

[105] Sometimes there is no other option than to put something up on the screen to evaluate the results. Or an example from a different domain: on the battlefield knowledge and intelligence will only go so far, and results can only be obtained by initiating action.

Part Two of the chapter now situates the executed results of the Core Creating Mechanism along a continuum. If the operation of the Core Creating Mechanism sheds light on one way of seeing the 'how' of the creating process, the Creative Continuum develops another perspective of 'what' as the independent variables of value and newness are addressed as outcomes.

PART TWO

Section One: The Creative Continuum

This section proposes a second model to expand the understanding of the creative process – the Creative Continuum. The Continuum is an idea's possible future path of incremental changes. An idea in this context is the full expansive term that encompasses 'ideas as abstract concepts' to an 'idea as a physical product' (a complete game). In the same way as an existing idea is the result of a historical path of incremental changes, the Creative Continuum is a hypothetical continuation of that series of possible incremental changes into the future. From an existing idea initially, a future point along the Continuum is the sum of all the incremental changes of 'newness.' Each incremental change is, in itself, new, different, and analogous to the continuous incremental future changes of an organism's gene. Newness is not a measurable quality along the Continuum. There is no way in which it can be measured. For example, we can say that the automobile has evolved along a continuum of 'newness' – or incremental changes – from the earlier versions of an engine-powered buggy, through mass market automobiles, to the newest version of electric-powered automobiles today. Each new automobile was incrementally different from a prior version. However, there is no method to measure by how much difference, qualitatively or quantitatively, from a chosen starting point, or between a 1930 automobile to a 2010 automobile on any kind of relative scale, or as proposed here, along a continuum.[106] Specific features are identifiable and measureable in some relative sense but are not measureable in any absolute sense. To continue with a somewhat tongue-in-cheek example, it is 'true' that today's tailfins are 687.55211 per cent smaller than those in 1955, but there is no way to measure tailfinness per se. The critical point to make is that from the past, these incremental changes were continuous, that is, one idea is an incremental change from a previous idea, and so the ideas along the Creative Continuum are a possible line of future game changes.[107]

Stuart Kauffman suggested a name for a variation in the natural world only being possible because of the existence of an earlier variation, making a later version possible, or that of 'adjacent possible' (2000). Only when an earlier idea exists can a following idea have incremental change from the earlier idea. The phrase beautifully captures the continuity of ideas from the past and the possibilities for the future. Nickles expressed it in evolutionary terms:

> But, of course, not even evolution creates something from absolutely nothing … Rather … it works by adapting mechanisms or designs or resources already available. New design genuinely emerges from old. Novel design is an *emergent* phenomenon. It is precisely characteristic of emergent phenomena that they manifest novel features although resulting from ingredients already present. (2003:59)

Both the past and the future are continuous; there are no breaks or discontinuities along the Continuum. All that can be stated is that ideas along the Continuum have some quality, which is different from any other adjacent idea on the Continuum in that they are something incrementally new from a previous version.

[106] Idea as product continuity was popularized by James Burke in his TV Series *Connections* and his popular writings (1978).
[107] An example from the game's domain: in car racing games, the newness is the addition of features to the game, both in the individual instance and over time. A new feature could be the ability to 'slide' around corners.

It is tempting to say that some measure of creativity increases along the Continuum, but that would be an error. There is no way to measure creativity. In the research, creativity is defined as a 'process' resulting in a product with two essential attributes: the product must be 'new' and that it will 'add-value.' Processes are not measurable, they can only be described with inputs, influence factors, and outputs measured. Newness as incremental changes may be described, but not measured. However, added value is measureable, and within the research context very explicitly, that is by Metacritic's ratings and a game's sales. Newness and value are independent variables. Different places on the Creative Continuum will have different values for an idea (or game). Intuitively we know it, since not all new, very new, or ultimately wildly new (crazy!) ideas or products appeal to us as individuals and hence they only give 'added-value' to us at specific places on the Creative Continuum. In game development, the amount of newness – the number of changes or new features – to be added to a game is determined by the development process and is under the control of the organization's games designers, management, and leadership. 'Added value' is the judgement of Metacritic and the market, and is not under the control of the organization, although it is possible to be influenced by the appropriate sales and marketing efforts. Thus, these two variables need to be clearly distinguishable and treated independently.[108]

Section Two: Comments on the Creative Continuum

The concept of a continuum is not new to creativity literature. For example, Simonton commenting on a response to an earlier article of his says:

[108] It is my opinion that not making this distinction between newness and value (as impact) is much of the problem in the discourses concerning the artistic or cultural industries with their emphasis on 'creativity' as noun.

> Where I might differ is a suggestion that eminent creativity is qualitatively distinct from every day creativity … Instead, I would maintain that they represent points on a continuous scale, with many graduations connecting them. (Simonton 2010b:191)

He does recognise that there is some kind of continuum, and explicitly that it is continuous. Here he is making the assumption that the further along the continuum the greater the creativity and hence the higher the value – presumably 'exceptional' equates with value. This thesis does not support this position, as will shortly be discussed.

Seana Moran from a systems perspective sees creativity along a continuum in this manner:

> Importantly, creative evaluations form a continuum. At one end is exact reproduction of a product or idea to preconceived specification (e.g. assembly line manufacturing). This end is usually considered uncreative, even if it is a valuable expert performance. At the other end is originality, conceived as a breaking from tradition to spawn new possibilities leading to cultural progress (e.g. Picasso's cubism or Einstein's relativity). (Moran 2009:293)

Moran's continuum again falls into the implicit assumption that the more 'creative evaluations' are further along the continuum. Again, as mentioned above it is not the appropriate presentation. In unfairness to Moran, the above quote continues where she goes right over the logic cliff:

> In the middle are various forms, including proficiency, which is the extreme of useful but not novel and eccentricity, which is extreme novel but not useful. (Moran 2009:293)

It is not the right structure. If anything, eccentricity should lie further out along a continuum than the contributions of Picasso or Einstein and would have a great deal of newness but without any added value.

The concept of a continuum is not a new contribution to the literature, but the insight that the Creative Continuum presents is: that it should be viewed solely as a future envisioning of the cumulative sum of all incremental changes and that newness (as a nominal description) and value-added (as an ordinal value) are independent variables along the Continuum. Litchfield was very clear that these were two independent variables:

> both brainstorming and organizational research have shown that novelty and usefulness are unrelated dimensions of ideas (Diehl and Stroebe 1987, Ford and Gioia 2000). (Litchfield 2008:659)

In the research context, the ordinal values are the revenues and profits to the organization, and the nominal values are the incremental features added to a new product.[109]

Segments

As suggested above, future games are positioned nominally along a Creative Continuum. It is the operation of the Core Creating Mechanism, in its various Modes, that produces a game. Again, as in the case of the Core Creating Mechanism's Spectrum, as a heuristic device, the Creative Continuum is divided into fuzzy segments to show relative differences in how products and their combinations differ along the Creative Continuum.

Figure 3 The Creative Continuum

[109] While agreeing on a continuum, it should be noted that both Simonton and Moran equate creativity with newness and ignore the value variable.

These segments – C1, C2, and C3 – are divisions of increasing newness. The left end of the Continuum is Replication – ideas as products, which are not new and hence not creative. By way of illustration, the segments could be seen as combining ideas:

C3 Known idea combining with another Known idea

C2 Known idea combining with an Unknown idea

C1 Unknown idea combining with an Unknown idea

The difference between Known and Unknown is context driven, that is, whether the product exists within a context or domain, and there is an awareness of the impact of the idea. When combining two known ideas (C3) that have not been previously combined, there is some possible knowledge of the outcome or range of outcomes. When a Known and an Unknown idea (C2) are combined, an understanding of the outcome becomes progressively more outside any prior contextual understanding. When combining two Unknown (C1) ideas there is even less visibility and understanding of the outcome. In other words, as an idea progressively moves to the right along the Continuum from known (Replication) to unknown, there is less awareness of both the outcome and the possible range of outcomes. Put simply uncertainty increases. As previously mentioned, the impact of an idea on the Creative Continuum is independent of its position: newness and value added are independent variables.[110]

In the Chapter Four (Literature Review), Sternberg's Propulsion Theory of Creative Contributions (1999, 2003, Sternberg, Kaufman, & Pertz, 2002) was mentioned as a contribution to the development of organizational creativity and this thesis' argument. His eight individual types of creative contributions can be rearranged and positioned

[110] As a way of a simple illustration, dog breeding can show examples along the Creative Continuum. Replication is the breeding of dogs from the same breed (say Labradors). C3 would be breeding dogs from different dog groups (say Labradors and Setters). C2 is exemplified by breeding Poodles with Labradors (very conceivable outcome, Labradoodles), and C1 would be the breeding of a lap dog with a Great Dane (unconceivable outcome).

along the Creative Continuum. He divided the eight creative contribution types into three main categories: a) creativity that accepts current paradigms and attempts to extend them, b) creativity that merges disparate current paradigms and, c) creativity that rejects current paradigms and attempts to replace them. Within these three larger groups are the eight individual types:

a) Creativity that Accepts Current Paradigms and Attempts to Extend them
   - Replication
   - Redefinition
   - Forward Incrementalism
   - Advance Forward Incrementalism

b) Creativity that Merges Disparate Current Paradigms
   - Integration

c) Creativity that Rejects Current Paradigms and Attempts to Replace Them
   - Redirection
   - Reconstruction/Redirection
   - Reinitiation

Sternberg includes ‘replication’ within one of his larger categorizations, and the Creative Continuum model has replication falling outside the creative process. His model has finer granularity within the classifications, and may make his distinctions at slightly different points on the Continuum, but apart from these minor variations, there is underlying congruity between the models.

C3 analogous to ‘Acceptance of Current Paradigms’
- merging known ideas

C2 analogous to ‘Merging Disparate Current Paradigms’
- merging known and unknown ideas

C1 analogous to ‘Rejecting Current Paradigms with Replacement’
- merging unknown ideas

The congruity is even sharper when the terms ‘idea’ and ‘paradigms’ are interchanged. Underlying both models is the perspective of moving from certainty towards uncertainty along the Creative Continuum. In a similar manner, McFadzean placed group problem solving techniques along a continuum:

1. Paradigm preserving – where no elements or relationships are introduced.
2. Paradigm stretching – where either new elements are introduced or new relationships are conceived. In other words, the problem space or paradigm boundary is stretched to enable group members to consider something new.
3. Paradigm breaking – where both elements and new relationships are introduced. This occurs when the paradigm's boundary is completely broken by the participants. (McFadzean 1998:133)

McFadzean was looking to change organizational ideas regarding problem solving. His terms of paradigm preserving, stretching, and breaking are what happens to the content with various actions. These actions are the introduction of his new elements, where first new elements or new relationships are introduced, and then both new relationships and new elements are introduced simultaneously. The essence of his paradigm changes are not misinterpreted when 'new relations' are interpreted as variants of new ideas. His model is consistent with the Creative Continuum, Dequech's risk-ambiguity-uncertainty continuum, and Sternberg's Propulsion Model.

The three descriptions vary somewhat in perspective, having variations on where segmentation occurs, as well as the motive force initiating the idea changes. However, the models agree on two central elements: the existence of an idea continuum, and increasing variance in ideas along the continuum.

<u>Along the Creative Continuum</u>

One way of illustrating differences along the Creative Continuum is to contrast dissimilarities in product generation using Lamarckian and Darwinian terms. In the late eighteenth century debates surrounding Darwin's evolutionary idea, Jean-Baptiste Lamarck argued an opposing view of the evolutionary process. The Lamarckian concept was that an organism passed on to its offspring characteristics developed during its lifetime. In the modern Neo-Darwinian Synthesis change is random blind gene mutation (Dawkins 2010). Replication is not creative, but the segment lying adjacent to it in segment C3 (Combination) is where changes to products are incremental from replicated ideas. In that sense, they are Lamarckian, derived from direct changes to the idea or product. Sequel products are a clear illustration of this, such as video games, books, movies, or TV shows. They are derived from, and based on prior products, with features in the originals being included in the sequel. Some companies' products are deliberately close to existing products. They are termed ‘fast followers,’ or ‘me too’ product producers. When their products are replications, even if lower cost, they are not creative. If there are marginal variations that add value, their place on the Creative Continuum would be within the C3 (Combination) segment. The Darwinian blind gene mutation mechanism is more applicable in generating C2 (Synthesis) and C1 (Unknown) products.

Much of the literature, both academic and popular, has taken the perspective that creativity only occurs in C1 (Unknown). As outlined in Chapter Four (Literature Review), many definitions of creativity contain the elements of ‘surprise’ and ‘novelty’ (cf Boden 2009). It is improbable that both novelty and surprise are going to occur in C3 (Combination) or possibly C2 (Synthesis). If products are combinations of known constituents, then those making the judgments are not likely to be surprised or to find a product novel. Similarly, the emphasis on the Aha! or Eureka! moment as being the source of all creativity and only happening at C1 (Unknown) moments, has biased the understanding of the creating process. Illumination or finding a value-added spot can occur anywhere along the Creative Continuum.

Previously in the discussion of decision-making, it was argued that decisions lay along a continuum, and that there was a mirror image between the decision-making process and the creating process. The Creative Continuum is a sequence of product changes that are, known (R– Replication), to relatively unknown (C3– Combination), to much less known (C2– Synthesis), to lack of knowledge as to the processes' outcome (C1– Unknown). At the extreme end of the Continuum (C1), the question is, 'exactly what will the product be?' With increasing loss of product knowledge along the continuum, there is increasing knowledge loss of how the product will be judged by Metacritic. The Creative Continuum is then reflecting the range from 'risk' to 'uncertainty' for both variables in the creative process – newness and value.

Two assumptions require mentioning and clarification. First, as previously mentioned in this chapter, the Core Creating Mechanism and the Creative Continuum arguments are positioned as constructs for single ideas or products and single contexts. It is not necessarily always true. Many ideas and products are developed with multiple markets in mind. For example, a major politician (i.e., Bill Clinton) will write an autobiography of his time in office with the notion of achieving multiple objectives. With the large royalty advances, current income was an important factor. The autobiography is clearly written for the mass market.[111] Yet at the same time, the book is aimed also at influencing the thinking of his political peers, and of course, future historians. Success is making the top ten in Amazon's best sellers list, while at the same time; a copy is in all the world's academic libraries. To use Csikszentmihályi's systems model again, the book will have different fields making judgements for different domains. Thus, there may be multiple places on multiple Creative Continuums for any product.

[111] Required to achieve high sales, and recover the large advanced royalties for the publishers.

Second, in considering the hierarchy of ideas, the apex idea could be conceived as a single idea, but in reality, any game – or any large, multi-faceted product – will be a mix of ideas (R, C3, C2, and C1's) that become positioned along the Creative Continuum.

Always Change and Decay

The Creative Continuum is constantly shifting, with the position of an idea or product always moving towards the left. What is new today will be old tomorrow. Cropley et al (2008), refer to this phenomena as decay. Although their definition of creativity and use of 'novelty' and 'surprise' implies the C1 (Unknown) segment of the Creative Continuum, the description is applicable all along the Continuum. As they express it:

> There is one problem, however, that all creative solutions suffer from—*decay*. It is self-evident that, from the moment a product is made public, its novelty begins to decline as it becomes less surprising. The longer a product is exposed to scrutiny, the less novel it will become. Because novelty is a prerequisite for functional creativity, any decline in novelty will result in a decline in the creativity of the solution. The solution will then lose the value that was added to it by its novelty, and may well lose its ability to subtract effectiveness from competing solutions. Thus, to maintain a high level of functional creativity over time requires either the continuous generation and regeneration of effective novelty, or some other means for preserving the surprise value of an existing product. (2008:109-110)

Newness decays over time as other new ideas, products, and games are developed which then become the new entities and criteria on which Metacritic judgement is exercised. The argument can be extended in that value also decays over time – video games (as all entertainment products) have a finite shelf life, and in too many cases too short to achieve the necessary revenues. As mentioned in Chapter Three (Video Games and Their Industry), Lampel and colleagues (2000) articulated that one of management's tasks in the entertainment industries is to anticipate future marketplace developments. Competition is always co-opting the latest 'hot' features. Metacritic is judging current games with a list of 'must-have' features. These 'standard' features today, were the new features of yesterday.

The task is to find the optimum spot on the constantly leftward shifting Creative Continuum. It is complicated by the extensive time it may take for the product to come to market. The question then is 'What do I have to create that will have a market impact in two years?' When a game is released, it must neither be too far to the right (too early, and too new), nor too far to the left (too late, and too old) to achieve maximum Metacritic ratings and consequent maximum sales. Not only will the Creative Continuum be shifting leftwards, at some rate of change, but also the rate of change will not necessarily be constant. The entire organization's task in anticipating the maximum point of impact at some future point is not an easy one.[112]

<u>The Ends of the Continuum: Chaos and Negative Creativity</u>

The ends of the Creative Continuum require mentioning. In correct discourse, it is imperative not only to define a continuum's unit of analysis, but also to define the ends of a continuum. At the right end of the Continuum, beyond C1 (Unknown) any ideas or products become so unrelated that the Continuum moves to complete disorder, or chaos. Chaos is used here, in the older sense of disorder and confusion, is in contrast to Chaos Theory's underlying system dynamics and sensitive initial conditions (i.e., 'The Butterfly Effect'). The product is moving through and beyond the realm of wacky or crazy ideas – where they might meet one attribute of the creating process of newness, but they certainly do not meet the other required attribute of value. The right end of the Continuum ultimately dissolves into irrelevancy.

The other end of the Continuum going beyond Replication is far more interesting and opens up the concept of 'negative creativity.' At the definition and conceptual level

[112] Metacritic's judgments change as new games come to market. Additionally enabling technologies both in hardware and software are constantly becoming more powerful. That is, environmental conditions also undergo variable rates of change.

negative creativity is adding value by the subtraction of newness, reverting to older ideas or products with fewer features. It is referred to as ‘frugal innovation’ in technology domains (Wooldridge 2010) Currently chiefly seen in the emerging economies, the concept goes beyond only cost reduction and lower prices, and aims to remove and simplify features or functions to increase value. These reductions open up markets at the bottom of the economic pyramid. It is a well-known practice in the games industry where older successful games are feature and technology detuned to run on newer low cost platforms. For example, many early mobile games and iPod games were older hit games from earlier TV console and PC platforms technologically translated down and over to the new platforms. While not within the scope of the research, the concept of negative creativity does bring into question the underlying and perhaps automatic assumption that the creating process must always be different and/or add something – there are circumstances where less is really more.

Critical Differences in Domains

Two additional comments need to be made regarding the Creative Continuum. The first comment, previously mentioned, requires additional emphasis. The Creative Continuum is time defined – any idea or product on the Continuum exists at a specific point in time. When a publisher ships a product, the primary concern is making revenues to cover all associated costs and generate a profit today – the larger the profit the better.[113] That objective is very much here and now; it is time defined. The publisher has little concern for a critic many years hence making judgments on how ‘creative’ the game was, and how it influenced the industry for all these years. Thus, the Creative Continuum, as part

[113] Attempting to build a multi-product franchise is within this context – only the timeframe is longer and may cover a period of years.

of the creative process, must be seen as existing within a specific context and at a specific time.

I have taken the position that a publisher's leadership and management should determine the position on the Creative Continuum that maximizes today's game value. There is no presumption that all ideas and games should target the C1 (Unknown) segment. In popular thinking, and in most of the creativity research literature and more so in the Western Science Canon, there is the implied assumption that the optimum objective is to maximize creativity, and this in turn assumed to mean maximizing newness or novelty. Thomas Kuhn is perhaps the most well-known advocate of this perspective. 'Normal' discoveries do not receive high accolades; those are reserved for 'revolutionary' discoveries. As Kuhn articulates his position:

> Most successful research results in the change of the first sort, and its nature is well captured by a standard image: normal science is what produces the bricks that scientific research is forever adding to the growing stockpile of scientific knowledge. That cumulative conception of scientific development is familiar, and it has guided the elaboration of a considerable methodological literature …. But scientific development also displays a noncumulative mode, and the episodes that exhibit it provide unique clues to a central aspect of scientific knowledge. (2000:13)

There are two implicit assumptions on which this thesis takes a different position. First, is the assumption of discontinuity. Kuhn suggests a 'noncumulative mode.' However, the thesis takes the position that there is only a continuous – to borrow Kuhn's term – 'cumulative conception' of ideas along a continuous Creative Continuum. Another way of expressing this is that there is no such thing as an immaculate perception; all ideas are explicit continuations of previous ideas. The second implicit assumption is that 'revolutionary discoveries' *only* occur in the discontinuous region of knowledge. To put it into a game context, all revolutionary games (e.g., those with the highest impact) *always* occur in this discontinuous region. The thesis is not going to take a position on

Kuhn's views in Scientific Realms, but substantially disagrees in the social realm of games.[114]

The argument the thesis is presenting is that creative products can be produced anywhere on the Creative Continuum in the segments of C3 (Combination), and C2 (Synthesis), or C1 (Unknown), with the underlying position of a continuous Creative Continuum. There may be domains in which value added can only occur in C1 (Unknown), but this does not apply to the domain of games. The conclusion is that in any discussion of creativity and the creative process, the domain must be specified, the requirements of newness, value added, and value judgment mechanisms must be clearly articulated.

SUMMARY

A number of themes have resonated throughout the chapter and found expression in two models that reflect Darwinian influences. The first is that creativity is not only about ideas. It is a process with four elements, each interacting in various ways and times to produce a creative outcome. Ideas are the raw material. Decision-making releases action on ideas, understands, and defines the appropriate constraints and the necessity not only to anticipate future execution outcomes, but also to anticipate Csikszentmihályi's field judgement of these outcomes. The creating process is fraught with decision errors and without effective decision-making; the raw materials of ideas remain merely raw materials. Creativity remains incomplete without decisions, iteration, and execution.

Second, positioning the results of the creating process along a continuum challenges the concept that maximizing the cultural concept of creativity maximizes impact. Likewise it

[114] As Lampel et al articulated, in the creative industries the products must be different, but not too different: consumers 'expect novelty in their cultural goods, they also want novelty to be accessible and familiar.' (Lampel et al. 2000:266)

is also suggested, that maximizing uncertainty does not maximize impact in every domain. Analogous to Metacritic’s judgement, the Darwinian mechanism of female sexual selection in birds is not all about the longest and brightest feathers she chooses, it is the survival of the most progeny that is the goal.

CHAPTER SIX

EMPIRICAL ILLUSTRATION

Introduction

This chapter aims to provide empirical illustration for the models advanced in the previous chapter. The research was undertaken using the Grounded Theory Method's (GTM) philosophy's, which derives conclusions from an inductive field interview process. The GTM process and the individual quotations do not prove the research conclusions. They can only build a substrate that strongly suggests social structures, processes, and patterns based on the interviewees' answers and direct observation, and the interviewer's abilities in interpreting the results. One of the strengths of the GTM is that it permits researchers to add their own insights to the research conclusions (Colorado State University 2011).

The objective of the chapter is to cite interview passages that illustrate the Model Set in operation: The Creativity Definition, the Core Creative Mechanism, and the Creative Continuum. Also presented are the operating implications of the Model Set: the leadership setting the creative constrains, and the tension between the idea and execution elements of the CCM. These topics are further discussed in the following Chapter Seven (Discussion and Implications). The quoted passages have been chosen to provide the clearest explanation for a specific model element. Additionally, the quotations may add context to the topic discussed, and in some cases, let the personalities of the interviewees come forth. In themselves, the passages chosen are discrete and are to illustrate a specific topic, but the patterns from all the interviews illustrate the findings of the work. The relatively small sample of interviews is to illustrate the Models. A much larger portion of the interviews was used to develop the Models with the GTM philosophy as mentioned in Chapter Two (Methodology). The examples below are a more selective sample of the interviews. The strategy of the chapter is to let those engaged in the creating process speak for themselves: On occasion, they are very eloquent. In many cases, the dialogue is rough and choppy and is as spoken by the interviewees, (and has not been heavily edited) to retain the flavour of their thoughts and context. There are up to four quotations for each model element.

By design, there is no analysis and minimum commentary in the chapter. The following Chapter Seven (Discussion and Implications) discusses the Model Set and Significant Findings, drawing together the main themes of Chapter Five (The Creative Process Models), and this Chapter Six (Empirical Illustration).

Section One: What is Creativity?

In the early interviews, this was one of the first questions asked. The answers included a wide-ranging multifaceted answer that reflects the confusion discussed in Chapter Four (Literature Review) surrounding the definition of creativity, to a curt one-liner. The wide-ranging and multi-faceted answer was:

> *In a real general sense, what does creativity mean to me? Crikey, how to answer a question so general? I suppose creativity to me is the, you know, it's the spark for enthusiasm, it's that sort of […] it's the lifeblood of any, I wouldn't say worthwhile criteria endeavour but any endeavour you know, by finding the lifeblood of something you know, what's essential, what's absolute about this that we must remain true to throughout the process, for me it's about collaboration, you know creativity […] I suppose a creativity in that sense, it's you know […] it's kind of very general terms, I mean it's about collaboration, it's about the generation of ideas, it's about many ideas filtering down to the right idea, it's about abstract thinking, it's about being able to operate in very ambiguous situations, it's about being able to take formless ideas and translate them into something that can actually be made, you know there's many ways you can view creativity but for me that's what it's about and when I think*

about creativity I do think about working with other people, it's not about the lone genius you know, it's not about the man sitting on his own in a room […] tortured you know, it's about teams, it's about teams and individuals. Yeah it's both about teams and collaboration but it's also about the individual. So I suppose in a very high sense that's what it's about. And you know for me that enthusiasm, you know enthusiasm for what you do its about […] creativity is about asking those questions, why, what if, you know it's a very inquisitive thing creativity I suppose in a very broad sense you know, 'What should we do with this, how are we going to do it?' That's a very general answer I suppose. (14:4-5)[115]

What a muddled answer – that echoes the common cultural lack of a real understanding of the word! In absolute contrast, one interviewee's minimum commentary on game creativity took it right down to the basics:

'Oh it's all creative and we're all fluffy', it's rubbish, it's a business, it's a software engineering business. (15:14)

In the same light throughout the interviews, there was no reference to the creative process being infused with something indefinably mysterious or special. There was no indication of anything like a 'magic pixie dust' requirement for the creating process. A number of interviews expressed their feelings that creativity was just hard work. During the interviews a number of references were made that creativity was just straightforward problem solving.

Creativity? Making decisions, making new decisions about new things. […] We're bright industrious people and we've got a problem, we've not seen this problem before, no one has, what are we going to do. I think that's how it works really; creativity for us is that we're confronted with something that may seem insurmountable. (11:4)

What was also apparent was the evident focus and enthusiasm of the interviewees in relation to their work. It is important to note, although outside the scope of the research, individual talent was mentioned repeatedly as an important, if not 'the' critical aspect of game development to achieve great success.

[115] The referencing convention used is to reference the first numeral as the interview number, and the second as the page of the transcript. This quotation is from the fourteenth interview and is found on page five of the final edited transcription.

[…] if you’ve got someone like Gerhard you have the option to make a ninety per cent game, if you don’t have a Gerhard you’re sort of a bit screwed, you’re probably limited to what you can get. (15:15)[116]

At the senior levels, it was brutally clear that the high-performance creative individuals had a disproportionate impact on the creative output of the organization.

Chapter Four (Literature Review) covered at some length the perception of creativity as necessarily having some element of novelty. ‘Novelty’ as a part of the creativity definition was not found to be sufficiently rigorous for use in the research. On this, one interviewee was quite clear:

I: *Well I think the thing with novelty is it’s a little bit […] pejorative isn’t the right word but it’s about sort of dismissive, it’s gimmicky and ‘that’s a novel idea’ and ‘that’s cute’, ‘that’s a novel idea’ but it’s not.*

wpk: *Put it in this framework.*

I: *I don’t buy novel games. (14:50)*[117]

In many interviews, the concept of creativity as new value-added ideas was introduced to give some focus to the interview and as a base for discussion. It proved to be very successful as the interviewees were intuitively aware that their task was to develop ‘something new,’ which had not been seen or played before, to the extent that it almost did not need mentioning. No interviewee expressed any disagreement with the ‘value-added’ component, and as one interviewee responded:

As far as the ideas are concerned I think all of them are customer focused, all of them are, should be, sales focused. You should believe that putting this into your product will have some effect where you will sell more of it at the other end. (22:13)

[116] The names of all individuals and referenced games have been changed to provide confidentiality.
[117] The convention followed where there are exchanges between the interviewee and the interviewer will be to distinguish the interviewee as ‘*I*’ and the interviewer as *‘wpk.’* For further clarity in the quotations, the interviewer’s bridging comments were deleted, transcription errors corrected and non-essential notations modified.

From these comments, the interviewees were comfortable in seeing creativity, explicitly or implicitly, operationalized as ‘new’ and ‘adds value.’

What were the interviewees’ comments relating to the Core Creating Mechanism?

Section Two: Core Creative Mechanism

The section starts by addressing the individual elements of the CCM – Ideation, Decision, Execution, and Iteration. Part Two, then integrates these elements into the four working Modes.

Ideation

The foundation of a game is ideas, and ideas can (and should) come from anywhere. One senior executive expressed it:

> *I: Pretty much everything starts somewhere and sometimes you take lots of influences from the real world or from fiction […] Ninety-nine point nine per cent is inspired from other products or real world situations.*
>
> *wpk: […] You said ninety-nine point nine, there’s a point one out there.*
>
> *I: That’s when somebody’s doing drugs (6:6,61)*

As the individual was so senior, I am certain the ‘point one’ period in his life was many years ago! It does not mask the very senior executive’s point that in game development, he sees all ideas originating from an external source – they come from an existing thought or product.

A senior producer nicely captured the distinction between ideas and the creating process. Ideas are incorporated into the creating process but, by themselves, are not the creating processes. This position has been taken as fundamental to this research. Ideas are ephemeral and ethereal until expressed in a product.

> *I think creativity is having ideas and I think the creative process is not having ideas; it’s shaping ideas and making ideas happen. An idea isn’t something until [it is executed…] anyone can have a thousand ideas, I could have a million ideas about a book [but] until I sit down and write the book it’s nothing, it’s just an idea. (8:22)*

The reason behind generating ideas – but not necessarily new ideas – is to achieve something specific to the game.

> *But then, I guess it’s really coming up with ideas that achieve a goal really. Ideas that are not necessarily innovative ideas, it can [be] that it is innovative or can be just iterations of other people’s ideas that can achieve a certain goal that you want to get to, whether to achieve a certain kind of sound or achieve a certain kind of feeling within a game or achieve a certain kind of emotion. (4:3)*

A game is the summation of many thousands of ideas.

> *One of the issues with creativity is not actually coming up with new things, it's just you come up with far too much.[…] it's choosing the things to bet on so your cost benefit analysis [is positive…] a large part of what we do at the beginning of the project is this, we have a million ideas. And it's literally whittling those down to the advantage at this end cost […] We do an awful lot of that. (22:9)*

The ‘whittling down’ is the decision process, the next element in the CCM.

<u>Decision</u>

The ultimate multi-million pound decision is to green light these high cost games. The gated process outlined in Chapter Three (Video Games and Their Industry) is a linear series of major approval points or gates, or decisions to continue development. The decision process flows down the hierarchy of Ideas and encompasses each single idea; there cannot be an implemented idea without an implicit or explicit decision. An interviewee encapsulated the hierarchy nicely:

> *On a different scale, so the decisions you are making at the beginning is, are we going to do a shooter or a racing game; that’s a huge decision, but it’s a decision you make and then at the end, the very last thing is you know, do we make this pixel green or blue; it’s doesn’t really matter but it’s a decision (32:2)*

Thus, idea and decision are inseparable from beginning to end. The interviewees had no vagueness in enunciating the relationship between ideas and decisions.

> *I'm thinking you can't really have one without the other because you have the idea; you make a decision about the idea. (26:10)*

> *Yeah choices, that's the big thing for me, it's always about choices. (31:3)*

> *Anyway, in general it isn't important where ideas come from or how they come, what matters is the choices you make, the way to choose to do that. (31:5)*

> *I think it's the decisions you make. Ideas are ten a penny, it's the ones you pick [...] It's picking the right ones and then executing them. (32:9)*

Ideas and decisions are clearly handmaidens inextricably linked together.

As mentioned earlier, the timing of ideas was important. A number of interviewees mentioned in the concept phase, that the team did not want any programmers present – they did not want to be told that it 'can't be done' (14:29). After deciding the key concepts and desired features, THEN the conversations start with the programmers 'if' the design features can be executed within the development constraints.

There is a little more subtlety in decision-making than just picking between ideas at the right time. Among many other factors, making decisions is about addressing compromises between two desired alternatives. One extensive quotation from a senior manager captures the flavour of decision-making as compromises, or choices. The compromises were cutting out features and achieving a lower Metacritic rating, or meeting the organization's financial requirements and shipping on time – decisions the organization's leaders must make.

> *But you know you can start to see some of it from this stage onwards and when you start to play it, get your hands on it and see it and get motivated, it's brilliant. The issue you have obviously is always that as a business we still have to [meet] day and date, you know, yes we have to hit the P and L for the product, we have to get the cost right […] the day and date, always*

> *becomes an effect on your game usually from a quality prospective, there will be compromises made on every single game, you will make compromises whether you want to or not because you have to. So* <u>*MudderCar*</u>[118] *was heavily compromised, a fantastic game, it wasn't an online game which at the time was quite a [market requirement], you know we probably took half a point drop for that, today we'd take a two points drop for it you know, that's how serious it was […] well that's how serious it is now, it was very serious then and we had to because we knew we would never have hit the date but we hit the date and we did that fundamentally because the business needed it. So there are compromises that aren't fun but you have to do. (17:10)*[119]

In the day-by-day negotiations to include the important features he wanted, a Chief Games Designer expressed the necessity to compromise this way:

> *I'm thinking, what's my head space when I do that [...] my predominant feeling about it is, I'm horse trading, I'm horse trading with different people with different things but underneath that, of course yes, I'm still being creative about it thinking. I can [get] this out of this and I can get that out of that and if I put those together, that gives me this. (31:17)*

Not only is the designer choosing between alternatives, he is deciding which ideas to combine.

These quotations have not touched on the myriad complexities involved in decision-making, but have focused on illustrating the relationship between ideas and decisions. As an example, somewhere in the decision-maker's mind in choosing between ideas, alternatives, or the many ways that ideas can be framed, are the decisions involving the three key questions. Can it be done? What will it be? What will be the value? Further surrounding or framing these questions are the constraints against which decisions are made, a topic addressed later in the chapter.

After ideas and decision, execution is the third element of the CCM.

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[118] This is a pseudonym for an internally developed game. For clarity, all game pseudonyms are underlined.
[119]The Metacritic rating is the standard compromised.

Execution

Product execution has not been a focus of the study. The mechanisms of creating rather than the process of actual game building were the focus of the interviews. There is no question that the building process has an enormous impact on the creative product. Of the total costs involved in developing a game, fifty-five per cent was involved in just making the components of the game, and that is before the further costs of post-production. Execution was under-emphasised in the field research, but not under-recognized in importance. As one producer directly involved in production expressed it:

> *wpk:* *So the creative process if I might put the proposition to you is both the generation of ideas and implementation.*
>
> *I:* *Yes and the implementation is more critical.*
>
> *wpk:* *More critical?*
>
> *I:* *Yeah.*
>
> *wpk:* *But you can't implement something if you don't have ideas.*
>
> *I:* *No but you can have a great idea and trash it with a crappy implementation. And there's lots and lots of ideas, ideas are quite easy to generate if you like, but implementing them is bloody hard. (9:21)*

Alternatively, as a senior executive expressed it:

> *I think you know it isn't just about the idea. It is about the execution of that idea. But in such a way that you know, is it unique, is it new […] it's a tough one isn't it? (17:15)*

The 'getting it done bit' is enormously difficult and hard, and cannot be over-emphasized in importance. However, the fourth element of the CCM is an integral part of the process – Iteration.

Iteration

Once again, the interviewees were very articulate on this element of the CCM, in seeing it as a fundamental aspect of the creating process. A game cannot be 'completely designed and specified' and then just built. Pragmatically, the more 'newness' in the game the more iteration is required. Moving rightwards along the Creative Continuum involves more risk/ambiguity/uncertainty – iteration is the required mitigating action. Simply, iteration provides additional knowledge, albeit both positive and negative, but does not come cost free. However, at some point in development, iteration must end and the game must be shipped.

Those interviewees that were more directly involved in the production were very clear:

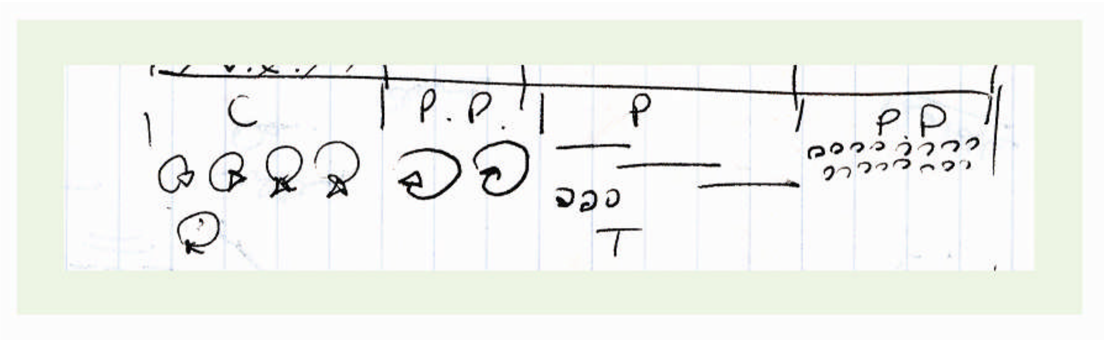
> *Yes, I think the whole thing is iterative from the beginning to the end. (29:14)*

> *I believe the very best games are the best because the creative process goes from the beginning to the end and all the time, you're not scared to throw anything away, you iterate all the time. (17:6)*

> *Some of that inevitably continues within the project and the way that Gerhard works is that a lot of what he does is quite iterative so that he'll get a level and he'll say 'Well you know it sounded good on paper but actually now I'm playing it, so maybe we should do this' (17:5)*

One producer drew a diagram of the iteration process over the development cycle. The size of the circles is the magnitude of the iteration, with the number of circles an indication of the number of individual iterations. The drawing starts in 'C' the concept stage, moves through 'P.P.' the pre-production phase and 'P' the production phases, with the last iterations in the post-production phase (written as the second 'P.P.') The larger iterations early in the development concern the higher hierarchical game elements and returning back to the first ideas. In pre-production, there were significant and large iterations as prototypes developed to test rigorously major concepts and features. In production, there were a few smaller iterations as there is the assumption that production knows what to develop. For example, after developing the first racing car, the remaining 'forty' are relatively straightforward. In post-production, there are small iterations, which were tuning, polishing, and balancing:

that's a different creative process, there you've got a very different kind of aesthetic, a very aesthetic form of creativity. (14:19)



Drawing 1 Iterations during Game Development

It is an idealized viewpoint where the game is coming together well in the final stages, perhaps a C3 (Combination) production. One chief designer only felt he could start putting the game together in post-production. Every game will have a different iteration profile, but there will be some iteration in every production phase as illustrated in the diagram.

Another designer was intuitively aware of the risk/ambiguity/uncertainly continuum.

Yeah, I'm big on iteration because you never know. If you're doing something with any sense of originality to it, even when it's not that original, you're not going to be able to know everything beforehand, you have to just take that as being part and parcel and you can't plan everything out at the start and expect that to work all out in the end. (31:11)

A Chief Designer described these staged iterations in a very similar manner. He was acutely aware that early in development some questions were just unanswerable. Some decisions (and ideas) should be deferred until later in the development.

Yeah you're kidding yourselves and you're going through gates when you haven't really gone through gates, the more I can iterate up to that three month period the more comfortable I feel, I've probably covered my bases and actually understand what it is I'm actually making because I've hits lots and lots of problems and I've solved some of those problems along *[the] way and maybe [I need to…] defer problems […] 'Well that's fucking huge' and I actually don't have enough information to form that solution to that problem because some of that information can only come through production. So defer that problem, I know that's to come, I know six months in production we'll have to ask for that […] I have confidence in our ability as a team as a whole. We have the intellectual capacity to solve that when we hit it and we'll have a better understanding of it then and that's the time to do it, don't worry about it now, we can't solve it now. If we pretend we can we're lying to ourselves … (9:43)*

Iterations are not only making improvements to ideas, but may open up further ideas or avenues of thought not previously considered, which is more of a discovery process than a creating process.[120] Mistakes and errors embedded in the game, which were not visible, may become so.

And quite often the iteration will suggest, and sort of like, unblock the next step which might not have been clear. (21:16)

Do you know, if you can iterate, even if you pick the wrong idea, you can iterate and put it right, because I saw BigGameCo[121] do that with BigGame, they had their own test lab internally in the studio and they got to the state of development where you could play the game and they actually tested all their ideas, the decisions they made, with the public. They put an advert in the local Game [store] or whatever the equivalent is, and every week they had a dozen people come in, sit and play their game and watch them play it in the test lab and they iterated around their decisions. And some of the decisions they made, they said no, we made the wrong decision, they don't like that, we'll do this, and; so actually you're right, that ability to iterate even gets round if you make the wrong decisions, if you are able to iterate and correct it (32:18)

Iteration is not a panacea for all development problems, and is emphatically not cost free. There are points of diminishing returns, but when striving for high Metacritic ratings there is little choice.

But it's true with all creative processes that if you iterate on something creatively the first time you iterate on it you might be able to make it 40% better, second time you will not make it 40% better again, it'll be 20% better. So there's always diminishing returns. (22:25)

[120] There is a significant difference in operation of the CCM between the creating process and discovery process, discussed in the following Chapter Six (Discussion and Implications).

[121] This is a Pseudonym for another game development company. For clarity, all pseudonyms are underlined.

> *I mean in my development experience [which] is quite long now, the best games I've developed have had an enormous amount of iteration in them and you might pay for some of that but the result […] far outweighs what you've actually done. (17:6)*
>
> *they're costing us more each time I have to say but you know a lot of that is because a lot of the methodology Gerhard uses is iterative and that's not necessarily the cheapest way of doing it, but it is absolutely the way to get you a triple A game every time. (17.9)*

Ultimately, iterations must come to a halt, and the decision for the game to pass the next gate, or the final decision to ship must be made.

> *I think iteration is a critical part of the development process, both in terms of creativity and polish but as with everything, you have to be able to say stop and know when to stop and understand where your critical path lies. […] There is a point where you've got to stop changing and you've got to start fixing and polishing.* (19:18)

The quotation does bring out the distinction between 'changing' – the iteration of features and their execution with creative implications – and the final 'polishing' iterations, which put on the final shine. Fixing bugs and polishing are essential elements in the post-production process, and when complete, the game ships. Moreover, as noted by our previous Interviewee 14 (page 188), these later iterations are likely to be smaller in scope and cost.

The number of iterations in each production stage is a compromise between the constraint of how much additional knowledge is desired or required, and the cost to achieve that knowledge. The higher the risk/ambiguity/uncertainty profile, the more knowledge is required. The number of iterations is controllable. They are necessarily under executive and management control (decisions) – a theme more fully developed in the following Chapter Seven (Discussion and Implications).

The interviews have illustrated the individual elements of the Core Creating Mechanism. In the following section, the same support is found for the integration of the four elements of the Core Creating Mechanism.

Section Three: The Modes of the CCM

The CCM is described in four modes that lay along a Creative Spectrum from ideation 'alone' at one end to execution 'alone' at the other. These Modes are arbitrary segments on the Creative Spectrum and operationally blend seamlessly from one to another (as in fuzzy set theory). The segments may not be of equal length nor equally spaced along the Spectrum. The segments are not necessarily monotonic and conceptually may flow into the adjunct segment and even be in operation simultaneously. The Creative Spectrum has been divided into four sections for exposition purposes – there are different ways the segmentations could be made – almost infinite number. The prior section of the chapter illustrated the individual isolated elements of the CCM. These elements are now brought together and shown to work together as a mechanism. Again, the four segments of the Creative Spectrum are:

Mode 1 – Ideas

Mode 2 – Execution to Target

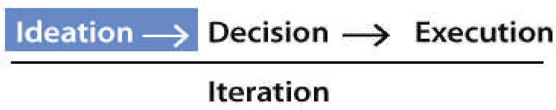
Mode 3 – Creating Mode

Mode 4 – Serendipity

From a theoretical perspective, the individual modes are not critical. They are a combination of the four elements that change in proportion or emphasis as the purpose of their use and their context changes. Although segmented, the quotations share a constant theme of the integration of the four elements. From this perspective, the four modes need to be viewed in a holistic sense: the process of their integration is the theme that runs through these examples. The granularities are only fuzzy transition points where emphasis shifts from one element to another, or to a combination of elements. Significantly, the decision element that is the backbone that ties it all together.

The segmentation is more relevant in the operational sense when direction and instructions are given to the development team. A leader or manager at any hierarchical level needs to be explicit in the instructions that individuals or teams are given so they remain within their Iron Triangle, and hence understand the implications of the mode within which they are operating. The operational perspective is further developed in the following Chapter Seven (Discussion and Implications).

<u>Mode 1 (Ideas)</u>



Mode 1 (Ideas) at one end of the Creative Spectrum is more about finding ideas anywhere and everywhere as an open-ended search.

> *Yeah, am I generating those? I don't know if I'm generating those ideas so much as finding them. That's what I'm saying about looking at references, it's more about coming out from me, about making myself open to all these things. (31:5)*[122]

The progressing along the spectrum is more of a closed-end search: searching in a defined space for ideas. Once found, these ideas can now be refined further.

> *I create a concept, [I] would then break down the features and I would create a subset of those features in pre-production let's say. And then all along that pre-production phase I'd be [having] lots of little ideas about whether something should be blue, whether it should be black, five minutes, ten minutes… (25:17)*

[122] There are further implications of Discovery in this quotation: Discovery as a unique process is discussed in the following Chapter Six (Discussion and Implications).

However, there must always be a central idea for the game – the vision that remains constant from start to finish. The passage below refers to a vision holder, retaining the vision throughout the development.

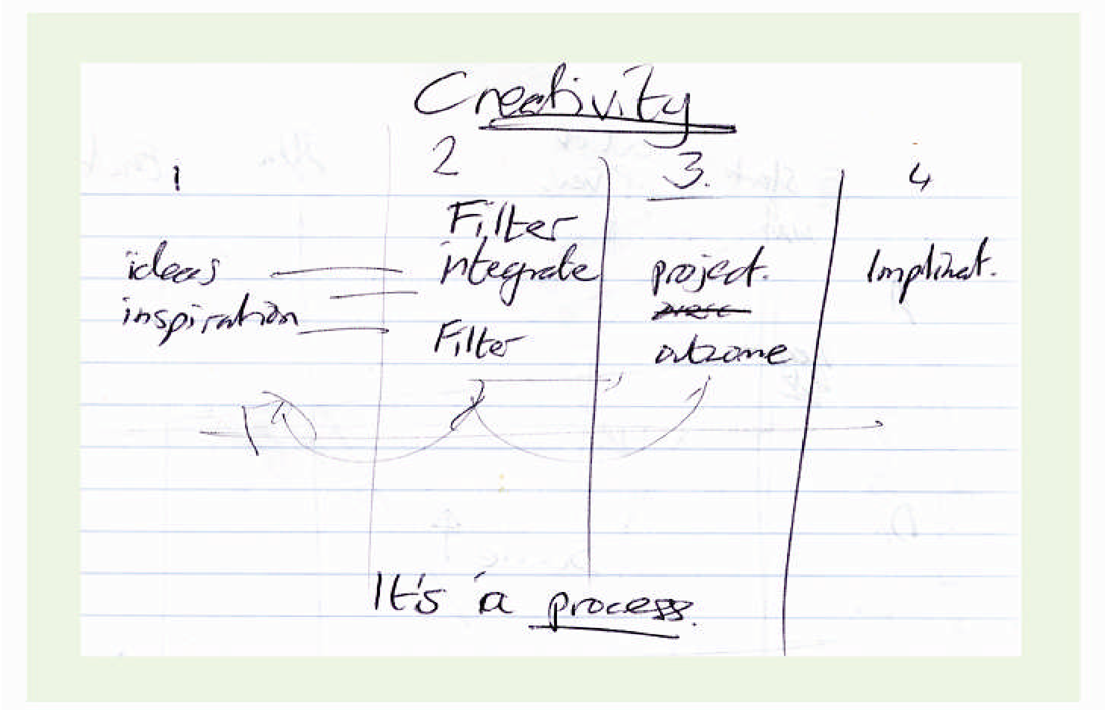
> *Yeah, that's what he is, absolutely. I mean I just have to go from there to there, and along the way, you know, many people have got the thought process, they know they've got to get from there to there and they all say 'I want to triple A game when I get to there' but they lose it somewhere along here, it might get here, but they've lost what that game was. Gerhard goes from there to there without deviating at all and he gets a triple A game. (7:2)*

When regarded as individual elements, or discrete units, ideas are content. When viewed from the CCM as a mechanism, they are an active part of the mechanism without losing their discrete character. Ideas can be replaced during the development process, or combined and synthesized (as in the other modes). Ideas may also act as constraints as in the quotation above where they are acting as a reference point. After ideas are found, selected, or chosen, the next mode along the Spectrum is to develop further these ideas to add value.

Ideas can be combined: here creativity consists in new ideas arising through the developing, manipulation, and combining and synthesizing of ideas into something new.

> *Well creativity is, it is the almost the what if, what if I took it like this and integrated it with this and it played out like this, I've got to now picture, will that solve what I'm trying to do here or in this case will it make a fun experience, but that's what I'm trying to create […] whatever the problem this end is. So the creativity you could say is taking all the bits of inspiration in your mind, putting the elements together, projecting how that would play out when integrated and whether that will solve your issue. (6:20)*

The same executive went through the process step-by-step up to the implementation stage, complete with diagram.



Drawing 2 Mode 1 (Ideas)

I: *Okay so I'm gonna take that idea and combine it with that idea to come up with that idea. So there's the integration.*

wpk: *So we've got, let's try this process then. So we have ideas.*

I: *Ideas provoke inspirations.*

wpk: *Okay and you've really said nothing new.*

I: *And method two is to integrate.*

wpk: *Nothing new.*

I: *Integrate and filter.*

wpk: *Filter so there has to be a decision making process...*

I: *Integrate filter, project in your mind, project the outcome for implementation. Obviously at this point you're going back to the board lots of times cause you're going 'Hold that that's not gonna work'. Go back to draw some new ideas and then go back through it again, so you're always going back to the board through this process aren't you? Cause even when you're implementing they just go 'oh I didn't think about that' and you have to kind of go back and go back.*

wpk: *Right, so this is the creative process we're talking about, the whole discussion.*

I: *Yeah I think so.*

wpk: *The whole discussion, this is what we're talking about. So creativity is not a thing, it is a process. We've captured it right here.* (6:31)

A technical programming manager, not a design manager, described the combination of ideas at the vision level:

I: *It's another creative process, it's another process that yes […] I can kind of see this game offering me these experiences, but they will normally be able to boil it down in terms of other things. They will go, well it needs to kind of look a bit like Blade Runner, or play a bit like Grand Theft Auto, or …*

wpk: *Right, we'll have a little bit of this and a little bit of this and a little bit of this, brought together?*

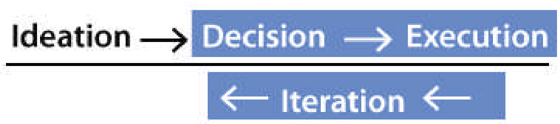
I: *Yes. As I say, they're not creating something new; they're just amalgamating a bunch of previous experiences. (*2:16)

One producer who was in the process of developing the concept for his next project proposal spoke about what he needed to accomplish:

Yeah and it's not all creativity. A lot of it is hard thinking about what will actually work. It's creativity and feasibility married into one. To me that's game development (25:25)

After finding ideas and thinking through the implications, the operations along the Spectrum then begin to involve the actual execution of the ideas.

Mode 2 (Execution to Target)



The clearest example of the Mode is the overall process of delivering, for example, a racing game to a specific segment of the market on this schedule, with these new features, with this budget, with this unit sales objective. Furthermore, these results will be achieved by meeting this series of gated milestones.

> *So we're given a brief, aren't we, because we're marketing led extensively, and so I would consider when we've been briefed to make a product, that product's place in the market place has been analysed and it is there for us to hit. So we should be making this product, I would probably take that, I'd generally take that as read […] Yeah, so we've got […] a window in the market has been identified for us, you know our target, our bit of the target to shoot at has been identified for us. […] Yeah and so we may question that but it's probably not productive for us to question that because we're simply rethreading, we're doing somebody else's job essentially. If we go 'Well is that market there?' we're probably not asking ourselves the right questions, we should be asking ourselves… our job is like what games we need to make to hit the window[that] has been identified for us*. (11:21)

One manager was articulate in expressing the essence of Mode 2 (Execution to Target).

> *But then, I guess it's really coming up with ideas that achieve a goal really. Ideas that not necessarily innovative ideas, it can be. That it is innovative, or can be just iterations of other people's ideas that can achieve a certain goal that you want to get to whether to achieve a certain kind of sound or achieve a certain kind of feeling within a game or achieve a certain kind of emotion. You kind of know where you want to get, so you know what you want to hope for, you know where you want to go to in that regard. You're trying to get there and the creativity comes together by saying, "How do we achieve this goal and how do we stay towards that goal (*4:3)

Ideas can also be tested against one another, for example the day-by-day 'Let's just try the idea to see if it works?'

> *So creativity is coming up with a new spin, making a prediction at what you think will work to solve your problem. (6:8)*

However, it is not always necessarily a well thought through process.

> *Do you think some people blindly go through that? They don't make decisions but they just go 'I have an idea.' Bang, let's go and do this. (18:15)*

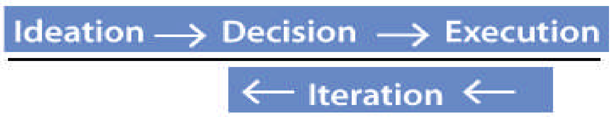
Not only can an idea be conceptualized as a single entity, it can be a suite of ideas.

> *It might be, so it's more of a repertoire and then you think you build a repertoire and you consult it when you have a problem, you go sort of like you've got some internal framework that you go through and you have 'no it's not that, it's not that, it's a bit like that but it's also a bit like that or it's exactly like that, I'll apply that solution. It's a bit like that one; I'll apply something like that because that's kind of worked'. (11:4)*

There are many ways in which to target ideas for execution, ranging from 'Let's test the idea out,' to 'Execute the idea this way.'

At the centre of the creating process is Mode 3 (Creating Mode) with the added element of iteration to assisting in driving the process forward.

<u>Mode 3 (Creating Mode)</u>



From a wide viewpoint, one manager expressed the mode as an invention, production, resolution process. The words are different, but the general concept is the same as the CCM.

> *Yeah, I think every time at that these project stages, you encounter a problem. I think internally, either as individuals or little groups, you're going to go through those invention and production resolution stages, but as the project structures itself as a phase of invention, a phase of production and a phase of resolution. But, I think again that's how human beings going about creativity and solving problems, is they go through I have ideas, I try them out, I reach a conclusion.* (11:6)

The following is almost a perfect example of the CCM operating. It illustrates the development of a single idea in a racing game, where the producer would not abandon an idea until it was implemented; that is, after a number of iterations!

> *I:* *I have an example of something that really worked in <u>Hit Racing</u>, it was a great creative idea which was the ability to reverse time. So you could actually, you could roll back time and recreate […] you know if you crashed the car rather than just having to start again*

you could actually sort of wind back […] So you can go back two bends and re-drive it […] and a flashback score so you get five of them in a race and if you play it on hard you get one of them. Now that idea actually came from Greg Norton […] he's Gerhard's design manager and Greg came up with the idea and then they're sort of spinning it around and they're like… and everybody was actually 'Ah it's a stupid idea' and Greg said 'Yeah a stupid idea' and Gerhard's like 'No, no I like that' and he grabbed it and he visioned it, what he was able to do was take lots of ideas and he had vision and ' that works' […] And he came under so much effort from brand who didn't get it and people on the team didn't get it, his own production guys didn't get it, but he held that, 'No we're going to do this'. So maybe it is execution […] He grabbed that and all the way through he's been 'I'm going to do this, I'm going to do this' and then they realised that on the first draft it was rubbish and he's like 'No, no it'll work you've just to get it to wow' and he was on demand, he was 'I want it' and then it delivered and they were going 'this is brilliant'. But actually, the first idea wasn't his but he grabbed that idea and drove it through.

wpk: *And there was iteration okay, you keep using that word iteration as being a fundamental part of this process.*

I: *Yes.*

wpk: *Okay, do you think that iteration…*

I: *Nobody gets it right the first time. Nobody gets it right the first time. (15:9-10)*

The example starts with an idea; followed by the decision(s) to implement (forcibly over opposition), then iteration against both the organization's perceptions and failed executions, until the final successful execution. The idea is now adding value to the racing game.

One of the strongest statements on the Core Creating Mode came during the discussion with a very senior manager. We had discussed the Core Creating Mode and these were his comments, where he both confirmed the model and related it to the central problems in game development.

I'm kind of, I'm sorry… I looked at it and go… and now I'm trying to break it and I'm struggling to, it's robust.

Because I'm trying to pick it apart and pull problems with it and I can't which is the real test when you're trying to break it, and I can't break it because that is what we do, and they are the factors. Is there anything missing? Damn if it's that simple, why do we fuck it up so much? […] There's also actually because you can get it wrong at every point as well so you make the wrong decision or the wrong idea, pick the wrong ideas you don't implement them long enough, you do no iteration, yeah that's what we did wrong because it's, yeah because we missed some of the bits out. (15:30)

It is doubtful if there can be a more positive affirmation of the CCM.

At the end of the Creative Spectrum lies the last Mode 6 (Serendipity), with the connotation of the 'accidental,' but with positive overtones.

Mode 4 (Serendipity)

'Happy accidents' happen during the journey through 'The Land of Serendipity' is an apt metaphor for Mode 4 (Serendipity). The essence of the mode is that there is no known outcome (as payoff or value-added) for any action or series of actions.

We just banged out loads of really different ideas and it was like 'Oh we'll just try that, we'll just try that' and a couple of them really went, and we was like 'Wow that was a big surprise' (6:5)

One way is to shake-up the existing situation, to make change for the sake of change just to see what happens.

You know everybody just get off your seats now right. Like add some reflections, come on look what we are doing […] it is like you deploy a new level and okay let's make that a little bit shinier, I said Okay you change a constant on the shaders again, Oh Man, that looks kick ass right. Let's add some reflections to it, so add some reflections redeploy, it is like Oh Man that looks so shiny now, it is so cool, that is creative process, that

> *is what we are doing, that is what we want to do constantly, we want to change and improve.* (1:9)

On the other hand, perhaps, taking a deliberative approach is appropriate for the situation.

> *A lot of it is, you see, a lot of that happening with techniques, or with tools, or with trying a certain technique, or something that will make something work better, just like 'why don't we switch this on? Oh see now, yeah, now that looks right.' That happens quite a bit, from an actual purely artistic [viewpoint]. (1:14)*

To return to an earlier comment, the Modes on the Creative Spectrum are chosen as segments to illustrate the CCM is working in a particular manner. Some working of the CCM may occur between the above-mentioned Modes. The following example lies between Mode 3 (Creating Mode) and Mode 4 (Serendipity), or the execution may move back and forth between Modes.

> *Not everything can be worked out ahead of time. Sometimes you have to be doing the problem to realise the scope and scale of the problems and after doing it can reveal or help you understand what the answer needs to be […] It's like move forward, just go, you have to start moving otherwise you'll never get the answer. The journey will help you reach the end. (9:25)*

That is a good way to conclude the section: 'The journey will help you reach the end' as an encapsulation of all Modes of the CCM, and the necessary iterations the journey entails.

The interviewee's comments have illustrated the CCM model, the second model of the Model Set. The first Model is developing an operational definition of creativity as a process with the required attributes of new and adds value – the 'what' of the creating process. The second Model establishes a process perspective, as opposed to Person, Product or Press perspective. The third Model, the CCM and the Creative Spectrum, is the 'how' of the creating process. The fourth Model, the Creative Continuum is the 'where' the result of the creative process has added value. The next section turns now to what the interviewees had to say on the Creative Continuum, the fourth Model.

Section Four: The Creative Continuum

The section starts by mentioning the continuous nature of the Creative Continuum, one of the important underlying constructs of the Models. Then in a fitting summary, the Creative Continuum and its segments are summarised as analogous to various ways in which to prepare a meal. Following the summary, there are comments on the individual segments: the C3 (Combination), C2 (Synthesis) and C3 (Unknown) segments.

Creative Continuum

Two interviewees were clear in seeing the segments as continuous, having no abrupt change in the nature of the games as they move out along the Continuum. They were implicitly indicating they did not see C1 (Unknown) games as discontinuous from earlier segments on the Continuum – there was no Kuhn's paradigm shift.

> *I've got one thing on that, it's about the C1, C2, C3. That's a discreet separation of these types of projects; I think personally, I would feel more comfortable if it was represented as a variable. You've got more or less creative risk I would say or something like that; I don't know what it would be. Now you can separate them in different [segments]* (29:19)

> *I think it's much more of a fan, where you know, it's shades of grey* (32:1)

'Represented as a variable' and 'more of a fan' are expressing feelings of continuity, rather than acknowledging any aspect of discontinuity.

To summarize the concept of the Creative Continuum, one manager exquisitely grasps the totality of the concept and describes it in terms of preparing for different types of meals.

> *C3 is almost like making a meal, you have all the dishes, you're trying to figure out which dishes will go well together, but you're not talking about really changing the dishes really. C2 is about, you know, if you're going create a new menu with new dishes in or you're going to try some dishes that have never been tried together, you're more haute cuisine to some extent. This is completely experimental; you don't even know if you're going to get any food at the end of that, you're completely revising the whole meal process and everything together. The point is, at this stage,*

it's very easy at the concept stage to try out different ideas and say we should put that and that together. They go okay, that's not the vision we had or it's very easy to express it to the team and say we'll do this like this, this like this and that's what we're doing and that's our recipe. So the concept phase here, you try things early; you fail things earlier at the concept. On a C1, on the concept, you don't know, you don't know [how] it's going to pan out and you need to implement it and look at it on software to be able to judge it. So you push your failure stake a lot further down the line and so your iteration has to go back earlier,[to the] concept [stage]. (29:21)

That dialogue is almost a perfect summary of the Creative Continuum. He has further captured both the essence of the risk/ambiguity/uncertainty aspect of the different segments, and increasing iteration necessary as the game moves further out along the continuum. Also revealing is the last observation on C1 (Unknown) ideas: if the necessary iterations are not successful, the reference is back to the original concept stage.

C3 (Combination)

At the centre of the C3 (Combination) segment is the combination of two known ideas. The interviewees were clear in their thoughts when 'just' combining ideas. The essential concept in the segment is that that outcome of the combination is known.

Yeah, which is why it's about choices, right, because don't worry about making something completely original, surely there's a good combination of things that makes something different and in that way, it's a new variation [rather] than worry about something that's never existed before. (31:30)

Absolutely, I mean we're adding some stuff in but it's not synthesising and it's not replacing but it's looking at what there is and doing it better than everybody else by adding in some new stuff and improving what it is. (19:12)

Do you know the only issue I have with new is it's not new, Left 4 Dead isn't new but it's a representation of existing ideas in a fundamentally innovative way. (14:10)

Left 4 Dead was a very successful PC and Xbox 360 game that achieved a Metacritic rating of eighty-nine. A rating this high is bordering on Universal Acclaim, or in other words a hit game.

We then move further out along the Continuum where less is known both about the nature of the combinations changes and what the combination will actually turn out to be. Will the combination work? Will the combination be of any value?

C2 (Synthesis)

Once again, the interviewees seemed to understand intuitively the synthesis of ideas flowering into something new and the difference between newness and 'just' a combination.

> *But the high concept was still the same; it was about… it was a combination of an old arcade game called Running Wild meets The Armourer, the popular cop show from the US directed by Michael James you know for the kind of set pieces and the sort of Hollywood excitement. (27:22)*
>
> *The really creative part of that is where you take something that's supposed to do this, and you take something else that's supposed to do that, you put them together and you go I can maybe do this rather than do those things and people go oooh, didn't realise that would happen and that's when it's really fun. (31:18)*
>
> *The other game that's made money is a game called Powerlord. The original Powerlord was done by an external studio and that was a synthesising job. They took elements of RPG, elements of adventure, some elements of action, some elements of strategy and they put it all together. (19:12)*

The beginning and ending of the segments are fuzzy, and perhaps may only ever be understood clearly in the mind's eye of the creator. What one creative designer or reviewer may see as a clear combination another may see as a synthesis. In the previous chapter, the differences between risk, and ambiguity were explored – those differences are relevant to the two sets of quotations above. As the game ideas move even further right along the Continuum, understanding becomes even more unclear and understanding of the execution outcome even less. Uncertainty increases.

C1 (Unknown)

The interviewees could conceptually understand the C1 (Unknown):

> *R [Replication] is through experience of just looking at the original code, C3 [Combination] is through experience of looking at other games. C2 [Synthesis] starts to be harder because through experience of trying things yourself and having tried things or thought about. C1, [Unknown] usually you go in there, you don't know what you're going to do. You need the first iteration to even know whether you've got something. (29:29)*

Essentially the same comment was made above in the meal analogy.

> *On a C1, on the concept, you don't know, you don't know it's going to pan out and you need to implement it and look at it on software to be able to judge it.* (29:21)

However, the interviewees could not articulate with any more clarity. It is understandable as the essence of the segment is the unknown. The only way to understand the unknown is to go there – try the ideas, and see what value results.

One senior manager made a very astute comment when discussing the segment. The comment started by noting that controlling the Iron Triangle arguably could not be done, and then he mentioned quality. Quality in terms of production values not game ratings, was not a high objective in the C1 (Unknown) segment.

> *But I wouldn't think to really do that, you could be … [controlling] delivery time and money or even arguably the quality, because a lot of C1 stuff isn't the highest quality ever. That's not what it does. […] It doesn't have the highest production because that's not its focus. (30:9)*

The comment is also revealing in that quality (as high production values, not Metacritic ratings) must then be more important in earlier C3 (Combinations) Continuum segment than in C1 (Unknown) games. It is the leadership's task to ensure that both the constraint of quality level (ordinal value) and the constraint of position along the Creative Continuum (nominal value) are established for the game.

What is also significant in the above quotation is the strong indication that production values may show some independence as a variable. Production values may have three impacts. First, games in the C3 (Combination) segment may need to have high production values to compete as dictated by the market. Secondly, from a cost point of view higher production values increase direct costs. Lastly, putting considerable effort into production values as well as the creative efforts may stretch the intellectual bandwidth of the team beyond the capabilities of the team and prove excessively burdensome. Thus, different production values may have different incremental values at different places on the Continuum.

These quotations have focused on illustrating and illuminating the three components of the Model Set, as individual elements and as full models. However, comments relating to the Model Set were not the only significant findings from the interviews.

<u>Section Five: Illustrating Significant Findings</u>

The chapter has let the industry participants speak for themselves on the Model Set. During the interviews, these topics became significant factors in the operation of the Model Set and the operational implications of the Significant Findings. These findings were first, the bimodal nature of the development – that is when there were two peak periods in the creating process, at the beginning and at the end of the development. Second, an organizational expression of a tension between the Ideation element and the Execution element of the CCM was expressed through the individual roles of the designers and the producers on the development team. Third, the expression of constraints – the parameters against which decisions are made. The significance and relationship of these additional findings to the Model Set are discussed in the following Chapter Seven (Discussion and Implications). They are included here in the interview chapter to provide the background for the later discussion.

Before addressing these findings, one topic requires comment. Did the interviewees confirm social judgments of quality in terms of the Metacritic ratings?

Quality

Chapter Three (Video Games and their Industry) discussed the importance of game ratings by Metacritic as the relative social judgment of game quality, and the relationship between these ratings and sales. A number of interviewees mentioned Metacritic as the arbitrator of quality having a direct influence on game development. One senior manager was very clear:

> *wpk:* *[…] what is quality?*
>
> *I:* *I would [...] you know; sorry I like to have objective answers to things rather than try and come up with something fluffy, I know what quality is; I would; my own definition of quality for a game, is it's game ranking [...] its game ranking, its Metacritic rating […] Yeah, that for me is what quality is, yeah, that's how I would judge quality of a game, because its massively subjective and you have to put some objective way [to it] I think. You can't say sales, because sales is too; there's too many other factors, yeah [...] it has to be; I mean I can sit and play ten games and tell you the ones I think are good quality and I can tell you the things I would look for to make it, that makes it good quality, so I'd look at production values. You know, how engaging it was, how aspirational it was, you know, maybe; and I don't care how long games are, so I could play a four hour game and say it's really high quality, the guy at the end of the table would go, well it's crap because it was only four hours, so I think quality is very subjective in our industry and that's why I'd always pull back to the game ranking.* (32:6)

In the same interview, the senior manager went on to say that when he worked in a previous company there were very specific targets set to hit the average game ratings of

75-80. These were games with licenses attached (e.g., a Mickey Mouse character license, or movie license such as *Ice Age*.). The historical statistics showed no additional investment was required to push up the Metacritic ratings to higher levels. The licenses and 'only' an average rating would achieve the required return on investment with the appropriate risk profile set for the project. Likewise, they were aware that for the development of an established game franchise, it was not necessary to achieve a high Metacritic rating.

Overall, the interviewees were clear on the objective of achieving a high Metacritic score in the genres where they were competing. Likewise, they were also aware of not achieving a high rating on prior games they had previously developed.

Now, what were the interviewee comments on the key findings of this research? In the remainder of this chapter, the interviewees' comments on the other key findings of the research will be considered.

Bimodal

In the interview, there was the initial expectation of finding a high-level creating process during the early concept and pre-production stages of development. It was unexpected to find the creating process to such an extent in the final stages of development. If there was any clear expectation, it was along the lines: 'let's decide what to build,' 'build the pieces,' 'now let's put it together and there is the game.' The following comment romanticized the designer's viewpoint:

> *In an ideal process, it tends to be for a designer, the typical thing for a designer they're going to tell you is that at the beginning, they're very creative, then in the middle not very creative and then at the end, more creative.* (29:11)

One chief designer was very aware of the creative efforts in the final stages of production, as he concludes 'I'm making the game there.'

> *Oh absolutely, yes, the beginning and the end there's a big [gap…] The middle is where I'm pulling my thumbs more than anything else […] I'm directing implementation to make sure the features come up to the standards required, well all the features that I want within it […] Once Alpha and code is locked, the features are working hopefully[as] bug free as they can be, this is my final tool kit to make the game [in] those last three months, that finagling period as I call it[…] I'm making the game there, (9:26)*

One art manager descried the final phase:

> *Quite often it's sort of that Alpha to Beta and GMC [Gold Master Candidate] period, there's a lot you can do, depending on what you define Alpha, you can be concept complete. But those iterations or the things that you're focusing on at that point they can make a truly significant difference to the quality of the product. Quite often I think you'll hear it said, I certainly didn't say it, and I've heard it said to me and believe it that often the soul of the product doesn't manifest itself until you get beyond Alpha, all of that period, like production, is just about getting the stuff in there. And it's only when Alpha to GMC that you actually realise the initial vision that was in concept. (21:10)*

The 'soul of the product' 'comes together' in the latter stages, which as the quotation says is 'scary' – since most of the money has been spent. In the next quotation, the first 'here' refers to Post-Production, whereas the following 'here' refers back to the concept phases.

> *You know even at Alpha you're rarely at vertical slice because there's always stuff you've thrown in because you're still iterating […] and actually the game comes together, the real decisions you make that make the game great are often here which is scary because imagine you made them all back here. (23:3)*

The bimodal nature of the development has profound consequences in the operation of the CCM and in the planning, managing, and resourcing of game development. Again, the implications are discussed in the following Chapter Seven (Discussion and Implications).

The Organizational Tension between Ideation and Execution

Mentioned earlier the tension between Ideation and Execution elements was mitigated by the decision element in the CCM. The dynamic in the operation of the CCM is played out or personified as individual roles in the team. Among the team members, the Ideation function is embodied in the chief designer, and the execution function embodied in the producer.[123]

> *So the general thing we're dealing in obviously is currently defined as time, money and quality. The infamous Triangle of Doom. And the current scenario is that time and money are to production and quality is with design. (30:11)*

Of course, it is already known in organizational culture, usually cast as the historical and mythological battle between the suits and the creative artists. Time and money are finite, and can be quantified and controlled.

> *And this is where the tension comes from; again, with production against design, it's trying to get that creativity down into a quantifiable amount. (26:8)*

In opposition to, or in tension against, a designer's nature. Major design should stop at some finite point, but 'never happens.' By nature, designers just continue to design.

> *Except I would say the design one actually would go [like this…] and then tails off and stop there. And we try and get it to do that, never happens. Never happens. Design guys are born to design and of course they will not stop thinking of new things or changing things if they possibly can. And, that's their job. (22:19)*

Once again, it is remarkably well captured in a short piece of dialogue.

> *I:* *[…] we talked before about the way that creative versus production, and tension; creative production produces tension, and that's why there is that tension, because that's the decision point, and he's thinking about creative quality, and he's thinking about cost, time, whatever and then making the decision, that's the point there; that's the tension point, is the decision...*

[123] In teams there are multiple ways Ideation and Execution responsibilities can be organized: e.g., they can be centered in one very strong individual, or allocated across many individuals. Expressed as two diametrically opposed elements is somewhat idealized.

wpk: *Is the decision...*

I: *Not actually the idea. He might think it's a good idea, he might think it's a good idea, so I'm not arguing about that, the tension is caused because they have different frames of reference, or different; not frames of reference, they have different rules of engagement let's say. He's got to make the engagement' great,' he's got to make the game 'done' […] and they meet at the decision point; I want to do this, I want to change this, but you can't, we haven't got the money, we haven't got the time, and that's why there's that tension between those two groups, I think. […] So I think the decision point is the fulcrum of everything.* (32:2)

That is not to say that the tension does not have problems in practice, but when it occurs, it is the manager's task, as part of the team, to resolve the conflict. The leaders and managers' role in managing the tension is further discussed in Chapter Seven (Discussion and Implications).

> *[…] the tension's a great thing actually, and yeah it can be explosive and it can be damaging but that's when it becomes unprofessional and you deal with that, that happens but you know the positive to it is it creates the best things. You know that tension […] is the spark between [them] that drives and you have to have a visionary, someone is going to have the ultimate say in this thing you know, they have to, but it doesn't mean to say that they're not stupid enough to understand that somebody else might have a good idea and that's when it works. (17:28)*

Many tensions exist during development, which affect the creative outcome, of which this is only one. It is significant that managing this natural tension can have a positive effect on the game quality. This task is distinct from the managing the tension where it inappropriately escalates.

The last of the additional findings concerns the constraints that act as the reference against which all decisions are made.

Constraints

> *[...] you have to get creative within the scope of the page that you're on. That's where the deep thinkers come through.* (20:8)

We have a limited resource, we have to do the best with it we can, and the focus is at the end of that resource to have a profitable product. (22:14)

I think the really truly ground breaking stuff has very few constraints at the initial level. I don't think if you really want to find something completely, the best example of a company, the best company doing it is Nintendo. I don't know what is on the cutting room floor in Nintendo but I suspect there's an awful lot of stuff there. Of everything that comes through I would think that there's 90 other things that got toasted very early on. They presumably have got some constraints somewhere but really [good] stuff, really blue sky thinking, I can't imagine you've got many constraints. You operate in a different level. It's about entertainment. That's your constraint, is it entertaining? (30:9)

As argued earlier, ideas required decisions for them to become operational. In the same manner, constraints are the parameters within which decisions are made. The 'ultimate' constraint was identified in Chapter Three (Video Games and Their Industry) – the profit and loss statement.[124]

Just as there is a hierarchy of Ideas, one can also suggest there is a parallel hierarchy of Decisions, and there is a further parallel hierarchy of Constraints. The leadership ultimately establishes the hierarchy of Constraints. It has been argued that for every implemented idea, there was a decision. It has also been argued, that constraints are the reference for decisions. One of the highest constraints is the genre of game (e.g., racing or shooter?), with the last and least constraint providing the reference for the colour of the last pixel change – should it be green or blue?

A problem mentioned more than once, was the task of appropriately communicating in a timely manner ideas to a team that can be as large as seventy-five or one hundred and fifty individuals. One programming manager started his comment with the difficulty of

[124] As noted in the quotation immediately preceding, developing an engaging game is a critical constraint. The objective is to maximize both, but in the end if an organization is not profitable, it will cease to exist.

communicating between levels of a team. He ended with the very prescient comment that decisions at one level are the constraints for the level below.

> *I:* *What's lost most of the time is a communication of one level up [of the] vision to one level down. They're saying you're doing this in the context of this [...] communicating at every level, and saying your ideas are within the context of this, your problem is to solve it within the context of that feature or that vision.* [Underlining added]
>
> *wpk:* *Could we call those constraints?*
>
> *I:* *Yes it is very clearly constraints, yes and someone's decisions are somebody else's constraints basically.* (29:3)

As the development progresses, there is an increasing 'constriction of constraints' as the game passes through the gates, and the iterations become smaller and less frequent. Without damaging a metaphor too badly, it be could expressed that the game is 'squeezed' out of the studio by the downward pressure of the hierarchy of constraints through the approval gates.

> *I find that when people are given boundaries and given restrictions when those are money, time, manpower, or whatever the usual sort of stuff and say, "Well, we need this goal achieving or we want to correct this feeling in the player, we still need that goal achieving. You still need to achieve it but with restrictions then, people go away. It may take slightly longer to come up with creative ideas or […] solutions within that, but they would come back with a lot of different solutions.* (4:11)

At a highest management level, a senior executive was quite clear on his application of constraints to the process of green lighting games. He created an atmosphere where ideas are generated in a relatively unconstrained 'free' environment, and then as the creating process ensues, increasing constraints are then applied as he guides the process.

> *That's what I'm after. In other words, you create an environment allowing freedom. They come with an idea, you apply constraints to it, they create again.* (20:7)

> *I do it from the bottom up, rather than the top down. The reason that the process that we have here […] is important is because at [the game's] infancy, I do not want it to be shackled by minimum corporate requirements. I come in and do that at a later date. (20:6)*

The ultimate control of the constraints must lie with the leadership of the organization, as seen in the following example.

> *I:* *Well the strategy I set limited the creativity because we can only iterate [so much…] I'm very fiscally aware so it was like we have time to do this, this is it done, and it's good enough and we would do the good enough…*
>
> *wpk:* *So actually you, you actually came and put the constraints around it on the production side rather than the artistic side. You capped the artistic side.*
>
> *I:* *Yes.*
>
> *wpk:* *That decision…*
>
> *I:* *Correct.*
>
> *wpk:* *Not by people, by decision.*
>
> *I:* *Because that was our business model. (15:14)*

In this instance, the framework of constraints was embodied in the organization's strategy and business model. In this organization, in fact in all organizations, the constraints 'ownership' is the responsibility of the executive leadership. Creativity has been defined as embracing 'new' and 'value-added,' with further elaboration as ordinal and nominal values respectively along the Creative Continuum. The executive leadership must ensure these two essential constraints are established for the game as the specified quality level or Metacritic rating (value) and the risk-ambiguity-uncertainty profile (newness) on the Creative Continuum. All remaining constraints such as questions of 'What will it be?' and 'Can we do it?' In addition, 'What is the Value?' are referenced against these two fundamental constraints.

SUMMARY

The thesis through this point has covered the following major areas: The research philosophy of the GMT (Chapter Two), the video game industry with the process by which these games are developed, including the industry background – (Chapter Three). The literature on the creative process then provided a theoretical background (Chapter Four), which was subsequently developed into the Model Set (Chapter Five). This chapter has provided empirical illustrations for the Model Set by letting the industry participants speak for themselves. Their thoughts, even when rough at times, have provided the necessary illustration for the Model Set. By the nature of the research methodology, they can only provide an indication of a firm substrate on which the Models rest. The interviewees were very cognizant that achieving a very high Metacritic rating was high on their list of priorities.

The chapter also let them speak on three additional findings that added further understanding of the Model Set and the Creative Continuum. The theoretical and practical implications of the Model Set are discussed in the following Chapter Seven.

CHAPTER SEVEN

DISCUSSION AND IMPLICATIONS

Introduction

This chapter sets out to answer the question 'What are the implications of the Model Set and the four key findings?' What are the praxis implications? The chapter begins by returning to the question of defining creativity, and some of the consequences of the definition used in the research. The chapter then integrates the elements of the Model Set into a cohesive overall framework to show the inter-relationships and cohesiveness of the parts. Following from the Model Set are four key research findings:

1) It is not all about ideas. Decisions are critical.
2) The CCM model illuminates the meaning of Discovery.
3) Maximization is not always the Optimum.
4) The understanding of the Build Model is critical in researching and managing the creative process.

The Chapter closes with selected comments on the implications of the Model Set to the theoretical literature, followed by observations that have significance to leaders and managers directly engaged in the creating process. Much of the creativity and innovation literature implies that there is a single way to create. A central conclusion from the research is there is a fundamental mechanism that is usable in multiple ways to achieve differing creative objectives. An understanding of the mechanism within a four-part Model Set has both theoretical and practical implications.

Section One: Definition of Creativity, Revisited

The Model Set influences the interpretation of the creativity and creative process definition. The first part of the Model Set establishes the perspective or overall framework of the research. Rhodes'(1961) division of creativity studies into the four P's of Person, Process, Product, and Press (or environment) provides the outside scaffolding for the Model Set. The research concerns the creative Process by which creative Products are developed in the games industry. The characteristics of creative individuals (Persons), or the creative attributes of Products (specific product aspects, or features), or the working environment (Press) in so much as they influence the creative process that may affect the Product are not considered in the research. It is suggested in this chapter that by understanding the variable and dynamic nature of the creative Process for developing creative Products, the tools of the Model Set be used to enhance the results.

The creativity and creative process definition used in the research is:

> Creativity is the generation of ideas by individuals that are both 'new' and 'add value,' which when implemented in a process at a specific location, context and time, result in a product…Creative processes are the methods by which creative products are developed.

The four key components of the definition are new, adds value, context, and time. Each of these components is essential in constraining the meaning of 'creativity.' Additionally, the components defined in this manner give some perspective of what is not involved and not included in the creating process. For example, the reference for 'adds value' needs to be referenced against 'value for whom?' In the research, the 'for whom,' are profit seeking organizations – game publishers – that measure value in terms of revenues and profits. A 'hit' game may – and mostly likely will – influence a significant portion of the game's domain (or a specific genre) and many future games will include these new ideas.[125] Thus value added ideas may have ***impact*** where value is added to the domain by the hit product. It is notably different from the value added to the originator, or organization that generated the idea. Value added as impact on other domains is also different from value added to the original 'intended' domain, and again more specifically

[125] In effect, this is the Creative Continuum moving to the left as new ideas enter the domain.

to the originator of the new idea.[126] 'Impact' occurs when ideas and features that originate in the game's domain, are used in other domains: for example, when films are based on game ideas and concepts such as the *Lara Croft* films.[127] These distinctions between value added to the product and impact upon the domain are important in understanding and evaluating the results of any product creating process. Making these distinctions is often underemphasised in the literature, but it is important for producers as they affect the reasons and objectives in developing the new and added value ideas and the resources involved in that development. In judging value added, there must be the reference 'to whom', the domain of that reference, and within what time period.

There may be occasions when commercial organizations will desire to have an impact on a domain – that is have their ideas adopted in the domain to create what might be called 'secondary derived value' – to dominate the industry and 'shut out' competitors, or to lead the industry in a new direction that the organization prefers for competitive reasons. To return to an earlier example – High profile politicians will write autobiographies for very large royalty advances: however, secondary reasons (among others) is to 'set the record straight' on significant issues and for the authors to influence future historians. The value added and impact components are different results of the authorship creating process. The research has focused on organizations that create ideas specifically to add value to them. However, not all organizations are tasked with revenue and profit maximization goals, and the value they add to their target domains may be difficult to both define and measure (e.g., non-profit or charitable organizations). The perspectives on the processes to add value 'to whom' that Picasso and Braque used in developing Cubism, or Picasso used when painting *Guernica,* which have had enormous impact in

[126] This thesis uses 'impact' in this restricted sense to differentiate it from adds value to the originating publisher.
[127] There may be some marginal licensing revenue to the originator,

the art domain over the decades, are different from a profit orientated publisher seeking to meet his profit requirements by developing hit games.

A further example may illustrate the distinction between internal organizational creativity and impact. In the 1840's the Viennese obstetrician Ignaz Semmelweiss insisted that doctors working for him wash their hands with a chlorine solution prior to working with patients under their care. Previously, he had determined that when following the procedure, the patient death rate fell significantly. Other doctors in the hospital rejected these findings and Semmelweiss – who was labelled a crackpot – was subsequently 'hunted into madness and early death' (Cropley et al. 2010:303). Semmelweiss's idea does not achieve the descriptive accolade of 'creative' within his context. While it was new, it did not have value, as it was rejected by the domain's field – the other doctors. However, it can be said to have had enormous ***impact*** when subsequently (i.e., at a different time and place) washing hands prior to patient care was adapted throughout the world (i.e., in different contexts).

The thesis is presenting the argument that when defining creativity as a process (or when seeing from the process perspective) that generates a product; there are only two parsimonious attributes ('new' and 'adds value'). The 'new' and 'adds value' attributes are always referenced to the product. In the interests of clarity, the thesis uses 'attributes' as the required components of the creativity definition. The sum of product features will determine if it meets the creativity definition requirement. It is a truism but all features are carried by, ascribed to, or inherent in the product. The quality of the product, which is the sum of its features, is determined by the domain's field (i.e., Metacritic in the games industry) (Csikszentmihalyi 1988).

As suggested above, a product is the sum of its features, which the field defines. Different attributes other than those used in the research may be included in the creativity definition. Many creators and researchers may, and do, see different product attributes as required by the term creativity. For example, much of the early creativity research included the implied assumption that creativity occurs only in the High Arts and Sciences (Mumford et al. 1997) and by inference must include some aesthetic element. This research takes a position that sidesteps the argument of what 'creativity' should or should not include as attributes of the product, other than the most parsimonious attributes of new and value added for this context. It remains to the creator or researcher to define for their chosen context, the specific attributes that the product must include.[128] The definition must be specific in articulating the necessary attributes, so those engaged in developing the product are aware of the constraints and can thus make the necessary decisions.

Further, it is suggested that whatever attributes are ascribed to the product to give it the accolade of creative ('a socially constructed label' (Ford and Gioia 2000:707)), that the working of the CCM is independent of attributes. In game development, the 'complete list' of game features is specified in the Design and Pre-Production stages. The sum of all the features of the game must meet the criteria of new and added value, for a specific context. The working of the CCM is not dependent on the attributes required of the product, as it is only the mechanism, by which the game's required features are translated by execution into a game.

It should be mentioned, that value added is not always direct revenues and profit for a profit oriented organization. One interviewee mentioned that Sony was making some

[128] In a game development context, these attributes are set by the organization's leadership.

games not to maximize profit from the game, but to sell more hardware units. The development costs would not be recovered by unit sales of the games. Sony confirmed during their interview, that their objective was to broaden the market and sell more hardware units. If Sony makes games that individuals wanted to play, they would purchase a hardware unit. It was in the longer term that Sony was looking to add value. High Metacritic game rating, of course, would assist in meeting these objectives. At times the value added constraint may be short term and measureable or longer term and not subject to direct measurement.

Definition is contextual

Once the perspective is adopted that creativity is a process, and critically that new and value added attributes are ascribed to the game, then the conclusion is reached that creativity is domain specific. What is new can only be determined with reference to a specific domain as defined by the field. Value added can only come from a domain, in this case the game market. Perforce, this is another way of indicating the Creative Continuum is domain specific, as all products with new features must lie along a specific continuum. It does not preclude Rhodes' (1961) remaining perspectives of Persons, Product, and Press (environment) as also contributing to our creative understanding. Certainly, characteristics of some individuals permit them to develop more creative products than others – this was highlighted by one senior executive's comment that without great talent to develop ninety point games 'you're sort of a bit screwed, you're probably limited to what you can get.' (15:15). Certainly, some individual products are more creative than others are – as seen in Chapter Three (Video Games and Their Industry), they sell more units. They have the appropriate features to achieve a certain level of sales. Moreover, there are some environments, which are more conducive to making new and value added products. By direct observation, the researched studios made an effort to aid in the flow of ideas be it by seating arrangements, or the availability of other games for individuals to play for new ideas. Each of these perspectives adds some insight into the development of new and value added products. What underlies each of the three perspectives is a creating process and operation of the CCM, generating a product that lies on a unique Creative Continuum.

The four parts of the Model Set act in an integrated manner to enable the development of creative products.

Section Two: Integration

The operation of the four Modes is complex when examined in detail. These differences are important in an operating context, where an understanding and use of the individual Modes can have a significant impact on the creating process.

The figure below is a representation showing the integration of the four parts of the Model Set. The Process perspective is the focusing element for the operation of the CCM. The Product element establishes the parsimonious attributes of new and value added. As suggested in the prior chapter, these attributes are established as constraints and are the foundational references against which decisions are made. The operation of the CCM develops the product for the quality evaluation of the Creative Continuum, with the ordinal values of quality (value added) and the nominal value of newness. The integration of the CCM into the Creative Continuum indicates that there are two broad operating paths, which can be generalized into a ‘Creating Path’ and a ‘Discovery Path.’

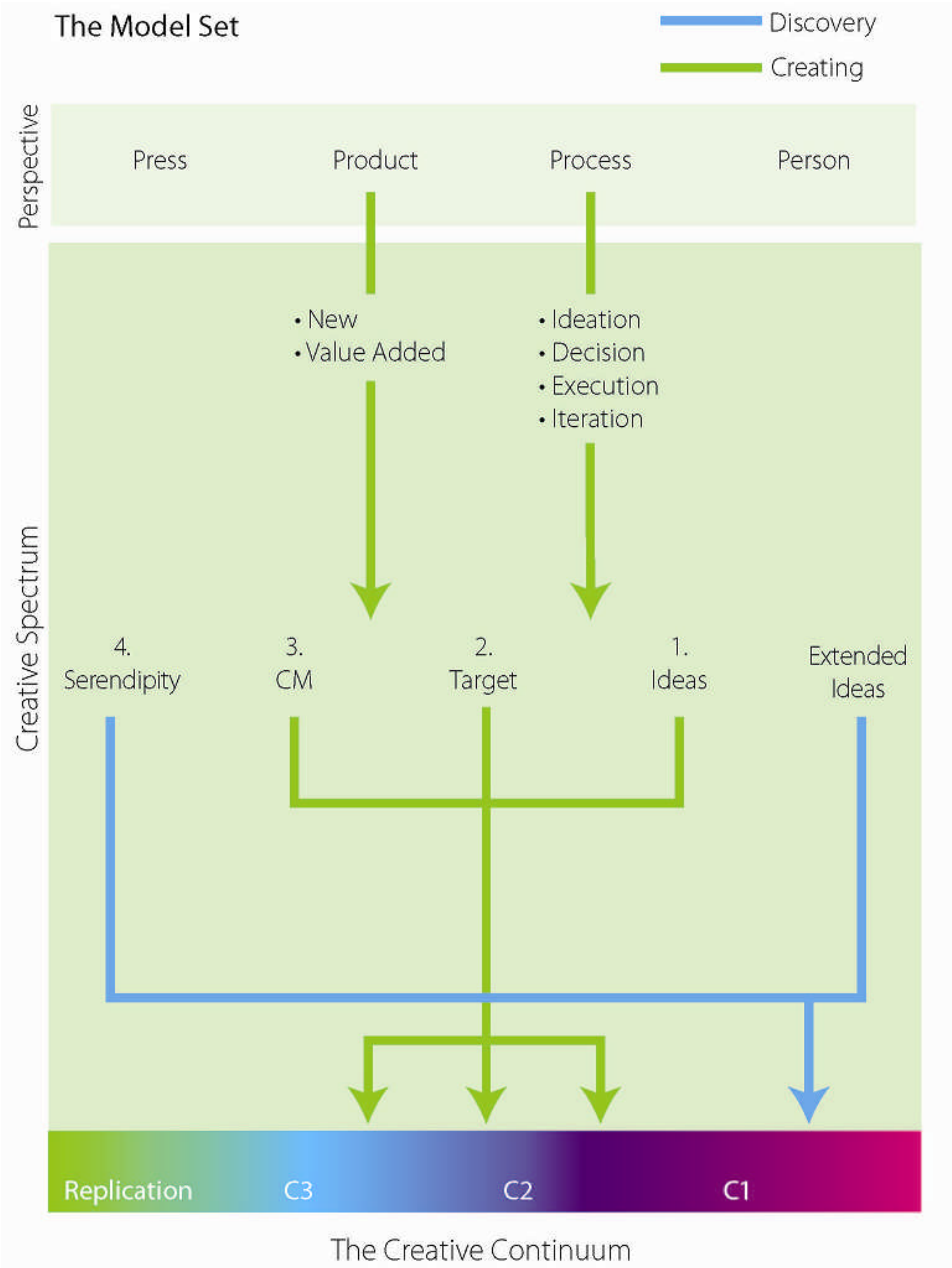


Figure 4 The Model Set

The first, the Creating Path is a wide, but bounded set of the Modes, with the path leading only to the C3 (Combination) and C2 (Synthesis) segments of the Creative Continuum. These are a portion of Mode 1 (Ideas), Mode 2 (Target) and Mode 3 (CM). The

Discovery Path is from the Modes at the far ends of the Creative Spectrum, the extension of Mode 1 (Thinking) at the extreme[129], plus the operation of Mode 4 (Serendipity). The Discovery Path is a different process from the overall Core Creating Mechanism. It is suggested that Discovery will generate ideas and products that will tend to be in the C1 (Unknown) segment of the Creative Continuum.

The Discovery Path has two sources. The first source is from the Extended Mode 1 (Ideas), and the second source from Mode 6 (Serendipity). Both of the forks emanate from blind, random, or accidental ideas. The Creating Path is the operation of the CCM process, with the Discovery Path operating differently. The difference is that the former is deliberate, and the latter is by accidental. It is conceptually easy to understand serendipitous results from Mode 6 (Serendipity), but the same accidental stumbling across something new occurs in the Extended Mode 1 (Ideas). In both cases, search may or may not be deliberate, but there is no a priori way of knowing whether there will be any results (as a new idea), or whether these new ideas will have any value. As mentioned above, the Discovery paths are more likely to generate ideas in the C1 (Unknown) segment of the Creative Continuum.

Mix and Matched to Task

Neither of the Creating or Discovery Paths, or the CCM modes are singly used during product development, but are dynamically mixed and moving from one to another, as various tasks and problems arise. Equally, as the Modes are not discrete segments on a spectrum, there can be slightly different emphasis within a Mode, that is, there is a

[129] The Extension of Mode 1 (Ideas) is the generation of wild ideas in unbounded territory, such as in brainstorming – anything goes. Conceptually, it could be a separate Mode, but was not developed to reduce model complexity. In earlier chapters the difference between blind and random was discussed. Extended Mode 1 (Ideas) is blind as apposed to random.

different emphasis on the different elements (e.g., Ideas, Decision, Execution, and Iteration)

Different Modes are applicable at different times during different development phases. In the Production phase when developing the assets, significant new ideas should not be introduced into the process. The definition of ‘significant’ is, or course, depends on the correct application of the Idea hierarchy. Ideas high on the hierarchy – for example the game concept, or major features – will disrupt the development if changed during the asset development. As there are always challenges and problems as the assets are developed, new ideas further down the hierarchy will still be needed to overcome these challenges. Solutions are found by using either the Creating Path or the Discovery Path.

The question can be asked, ‘Is there any optimum mode?’ Operationally Mode 2 (Target) would be considered the optimum – the desired result (Idea) has already been selected as having met the constraint and feature requirements. Not to underplay potential problems in getting to a target result, nevertheless having a target does give, at least to some degree, a route on how to get there. It would tend to minimize time and cost. One essential point to emphasize again is that the decision has been made that the idea in Mode 2 (Target) meets the necessary requirements. Moreover, it is presumable quite likely that in order to define a target in the first place, other modes may have been necessary.

Mode 3 (Creative Mode), as the essence of the CCM, from a theoretical perspective is the optimum mode – with the concept taken directly from the theoretical mechanisms of Darwin, Campbell, and Simonton as developed in earlier chapters (with the significant operational differences as noted). In an evolutionary environment, the mechanism drives all change. In an organizational setting, the key to the Mode is how much is gained per iteration – a clear trade-off between time/cost and incremental new ideas and value. Taking many small incremental steps as iterations can be a very powerful problem solving local mechanism, as well as a strategic choice at the highest organizational levels. Sometimes it is expressed as 'fail early and often' and 'recover quickly' at the local level, or acting as a fast follower at the strategic level. Taking incremental steps, as opposed to large continuum steps, is a way in which to make forward progress while reducing risk.

Mode 4 (Serendipity) can be used in an active manner – find ideas with a random, but driven, process. Serendipity derives from just doing something, anything, making 'stuff' to see what happens. There is no a priori way of knowing what the results will be and hence if any results will be of value. None of the three crucial operating questions is answerable in advance.[130] There is a time/cost element in using the mode, as no results are obtained without some commitment of time and cost. The time/cost commitment is open-ended as there is no assurance as to when, if any, results will be obtained. In a passive manner finding a new idea, feature, or attribute is true serendipity, and is just a lucky accident if it does happen.

The Modes of the CCM are integrated with where on the Continuum the product is targeted. The Mode choice drives the positioning.

<u>Continuum</u>

Individuals are constantly seeking new experiences (Dutton 2002) which causes the constant leftward movement of the Creative Continuum. Moving in the sense that it is continuously changing, what is new today is old tomorrow. What is C3 (Combination)

[130] Can we do it? What will it be? and Will it add value?

today, is R (Replication) tomorrow, similarly for C2 (Synthesis) and C1 (Unknown). There are two key aspects of the continuous motion. First, the speed at which the Continuum is moving left, is reflected in the number of competitive ideas (as products), and how quickly they enter the game market. For example, a very high rate of C3 (Combination) products, which are only marginally different from each other. Secondly, what is the extent of the changes between the games? Are the games only incrementally different from their predecessors or do changes amount to major shifts along the Continuum, such as a constant stream of C2 (Synthesis) and C1 (Unknown) products? Collectively, these two factors would determine the 'rate of decay' of the Creative Continuum. The rate of decay will be a significant factor in the organization's leadership decision-making on the new and added value features of future games, to be developed in two or three years' time.

Some competitors will 'go where the money is' copying successful games (to lower risk). Some competitors will go for newness to achieve competitive advantage (to differentiate product). Not only can different competitor actions differ, but also there are different types of markets. As Galenson notes (2009) there are experimental markets and conceptual markets reflecting the gestalt or tastes of the times. In his study, the markets the research covered were popular songs. The experimental markets wanted songs that treated 'common topics clearly and simply' (Galenson 2009:17) which occurred in the 1940s and 1950s. In contrast, conceptual markets desired songs that were 'radical departures from traditional conventions and practices' (Galenson 2009:27), which occurred in the 1960s and 1970s. From the perspective of potential product producers, the market fraught with the most uncertainty are those fast changing conceptual markets. Conceptually, and in my diagrams, the various segments (i.e., R, C3, C2, C1) of the Creative Continuum are presented as equal in length. In light of a highly experimental market there would be compression in R (Replication), C3 (Combination) and into the left hand segment of C2 (Synthesis). There is, of course, the corresponding expansion for conceptual markets, particularly in C1 (Unknown).

Certainly the principle use of the Creative Path or Discovery Path (or selection of Modes), is going to bias a product's final position on the Creative Continuum. Alternatively, the desired position targeted on the Creative Continuum, will dictate the appropriate Path. The use of the Creative Path is more likely to successful in delivering C3 (Combination) and C2 (Synthesis) segments, as the choices of new features are decided, and the outcome is relatively well understood and the risks are lower. Alternatively, seeking a product in C1 (Unknown) Mode use will migrate more towards the use of the Discovery Path.

As previously discussed, the risk-ambiguity-uncertainly will increase, as the product moves towards the right along the Continuum. The outcome becomes less known in terms of both parsimonious attributes of a creative product: value, and newness. Risk-ambiguity-uncertainly increases with the nature of the market as the rate of change increases. In Galenson's terms, this is a shift towards a more 'conceptual' market (Galenson 2009). In terms of this research, it is a shift towards C1 (Unknown) ideas and products.

Again, the operation of the two Paths is integral to determine where on the Continuum the product will lie. The choice of which Path to use during development, and the decision element within the CCM modes brings to the fore again how fundamental decisions are to the creating process.

This section has discussed the integration of the parts of the Model Set. Specifically it has examined the different parts of the Model Set – the Core Creating Mechanism and associated Modes (process) – are integrated with the product's position on the Creative Continuum (desired outcome).

Section Three: Four Key Findings

Much of the creativity literature as outlined in Chapter Four (Literature Review) implies that creativity is a singular process, that is, there is only one specific way in which it occurs. The development of the Paths and Modes in the Creative Spectrum, suggests that there are a multitude of ways in which creativity occurs. Creative products themselves are not singular – a binary opposition between creative 'yes,' or creative 'no' – but are positioned along a variable Continuum. The two defining questions for any game project – how new and how valuable (the sum of the individual product features as seen by Metacritic) – need to be answered. As the answers to these two questions become clear, the ultimate constraint of the P&L is developed.

The Model Set provides a framework to understand the creating process. The CCM as a mechanism can be considered the 'how' of the process, the Creative Continuum a way of evaluating the 'what' of the creative process. Each is not monolithic, and neither is the integration. The CCM provides a range of alternative ways in which creativity happens. It is a range of possibilities. The Creative Continuum is a range of outcomes that provides a way of seeing the ordinal values of quality (value added) and the nominal value of newness.

In addition to providing an overall framework for the creating process as described in the Model Set, four key findings became apparent:

1) It is not all about ideas. Decisions are fundamental.
2) Maximization is not always the Optimum.
3) The CCM model illuminates the meaning of Discovery.
4) The understanding of the Build Model is critical in researching and managing the creative process.

Each of these four key findings will be discussed, with the chapter closing with a discussion of the implications of the Model Set from both the theoretical and practical perspectives.

Not all about Ideas, Decisions are Key

Both in the current theoretical writings (Zhou and Shalley 2008, Gilson 2008) and popular writings (Johnson 2010), the concept of creativity is associated almost exclusively with ideas. As Silvia has expressed it 'the massive literature on generation has overshadowed the question of evaluation.' (Silvia 2008:139). As mentioned in Chapter Four, the literature is beginning to address evaluation. In the past few years there has been an increased awareness of the 'later stages' in the creative process of idea refinement (Lonergan et al. 2004), idea evaluation (Lubart 2001), and idea selection (Rietzschel et al. 2006, Basadur 1995, 1997). The thesis takes the position that there is a subtle, but important distinction between evaluating an idea, and making the decision to implement the idea. Implementation means deciding to commit the necessary resources for execution, with all the risks and problems that then ensue. It is those decisions that produce the game for the market, with the appropriate attributes for successful sales. These are the only decisions that matter. For those engaged in the creating process, their important moment is when the game ships; that is their moment of creativity.

In Chapter Five (The Creative Process Models), it was argued that the formal creating process and the formal decision-making process were mirror images of each other, and even if conceptually considered different processes, they are inextricably intertwined, if not one integrated process.

It is suggested that decision-makers during the creating process continuously have to answer three key questions:

a) Can it be done?
   Is there enough time and resources? Are my people up to the challenge, and do they have the appropriate talent and experience? Is the building process known (I have done this before.), or is there an ambiguous situation where the building process is unknown (I have never done this before.).

b) What will it be?
   When the idea is up on the screen, will it be what we thought it would be?

c) Will it be of appropriate value?
   Will the sales/profit objectives be met for the accepted risk/ambiguity/uncertainty profile? Will the game be right for the market? Will the appropriate quality level as a specific Metacritic rating be attainted?

When developing these expensive games, multitudes of ideas are generated with multitude of decisions made. On an hour-by-hour basis, this is what managers do. Many of these decisions are required instantly – on the spot – as approval of ideas, or instructions to subordinates to execute. There is no time for the elaborate decision-making models as outlined in Chapter Five (Creative Process Models).

As more than one interviewee indicated, ‘I just don’t have time to wait around for the Aha! Experience’ That is, ‘I am too busy dealing with what I have at hand.’[131] In other words, making decisions and executing.[132]

[131] During the interviews, this was the response from two senior design/team leaders when asked about the Aha! experience.

The decision-making process drives forward the creative process and puts ideas into execution. Equally important is the corollary, that an idea should not be executed when it does not meet the requirements of the decision constraints. In the development process, development should proceed until the requirements of the gates and gatekeepers are met. Whether in a rich idea game environment, where the interviewees indicated 'Ideas are a dime a dozen,' or in an idea-poor environment where conceptually idea selection carries higher risks with fewer alternatives, decision-making is fundamental. It is tempting to ask and explore which is most important: ideas or decisions. However, that is the wrong question, as they are so entwined that the answer is that both are fundamental. As a minimum the effort that is expended into generating ideas, should be put into the decision – making process and understanding the constraints, against which the decisions are made.

As one interviewee expressed it:

> *It is absolutely true because I guess the more experienced you get and the better you get at doing your job the more rapidly you feel able to make those decisions as well. The more rapidly you hit the quality that you're after. The more rapidly you realise that creative germ that you've all been contributing to. (21:23)*

As mentioned in Chapter Five (The Creative Process Models), decision-making is subject to less-than-optimum results due to assumptions of rationality, while also being subject to multiple sources of structural failure – some of which are systemic. Failures do not occur at the ideation stage, failures occur during the decision phase of the CCM, and during execution. There will be many more ideas articulated during game development than are approved by the decision-making process. However less-than-perfect that process may be, decisions are fundamental, as without them, nothing would be executed.

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[132] However as one reviewer of the thesis commented (an experience game designer): '"Eureka" happens because I am trained enough to recognize that something significant has been discovered. Without training and a seasoned eye, I might never notice something great has happened.' Mike Moore in a private correspondence sent January 2011.

The second key finding challenges the assumption that the more creativity there is, the better the results.

Maximization is not always the Optimum.

There is an underlying assumption in creativity studies, and our Western culture in general, that maximizing creativity maximizes value. The emphasis is on ‘newness,’ assumes that will equate to higher value. There is little or no distinction made between maximizing value for the producing organization, and the impact the idea may have in the wider domain. The first figure below illustrates this assumption. Moving along the curve from left to right, replication of an existing idea, product, or game is assumed to be of little value,[133] but increasing the newness is assumed to add value. There is some implied recognition that at some point, only ‘novelty’ will occur and value will diminish. Thus, from this perspective, higher value is found in higher creativity or newness. Risk-ambiguity-uncertainty was suggested earlier as occurring along and fundamental to, the Creative Continuum increasing from left to right. Rather than maximizing creativity, will the game achieve the necessary attributes of ‘newness’ and ‘value’ to meet the green light constraints established by the organization’s leadership? When a game does come to market, it is expressed as a single point on the plot line. The curve is an expression of the common concept that the further right along the Creative Continuum, the higher quality/value. That is, more money is made by being more ‘new’ (alone).

[133] This is true in domains requiring new ideas, products, or games on a continuing basis.

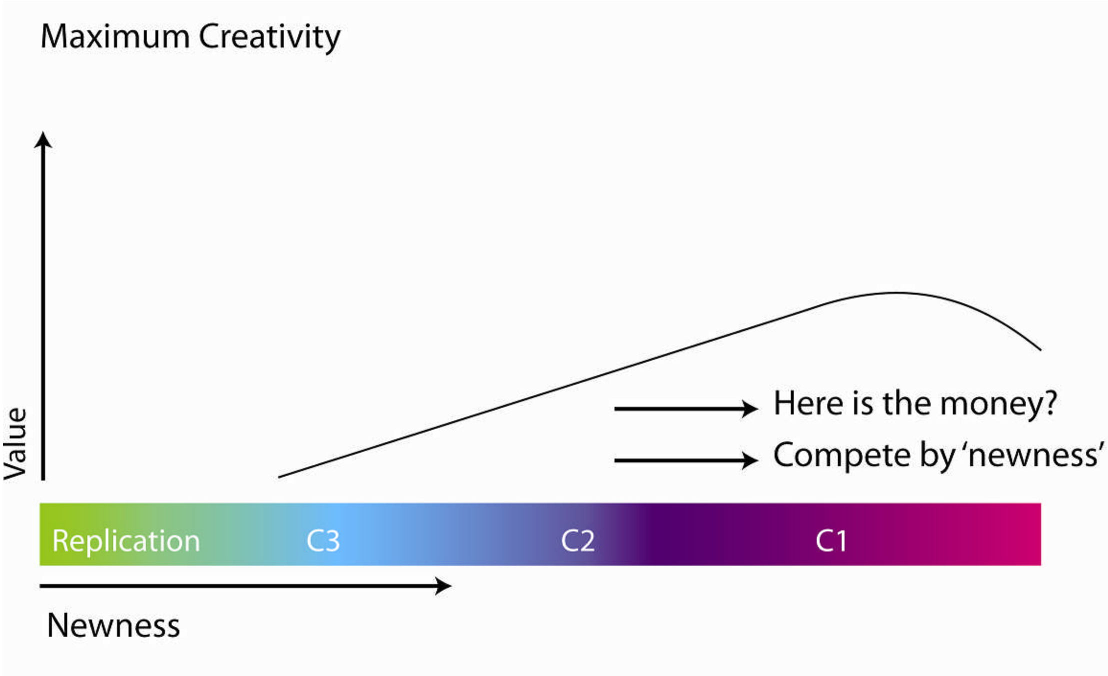

Figure 5 Maximum Creativity

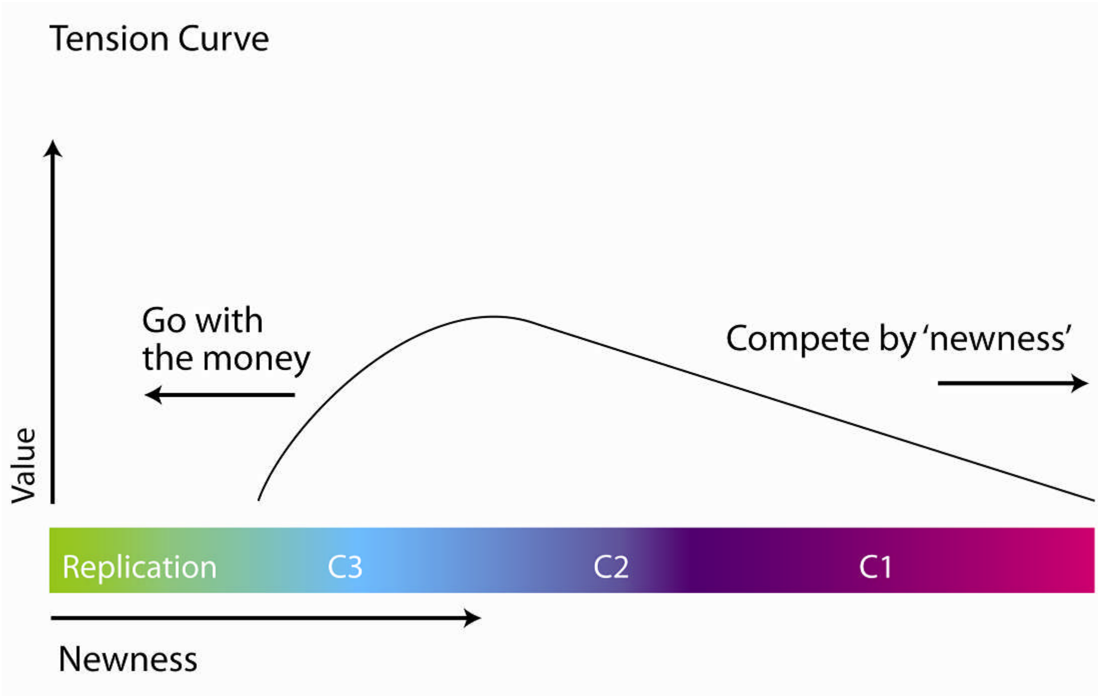

Figure 6 Conceptual Tension Curve

A second conceptual figure with the same axes as the one above is drawn describing the tension between value and newness along the Creative Continuum. The curve is again an unequal sided inverted U-shape. Starting from a low point on the left portion of the

Continuum, the probability of achieving a high Metacritic rating is very low as the game is ‘just’ a replication or copy of what is currently in the market today. Given competent development, the curve then rises to some optimum point – a balance point between doing just enough to achieve differentiation from existing products, and the risk of being ‘too different.’ The curve would then fall off as the game become too different or ‘too new.’ Another way of describing the curve is the balance between ‘Following the money,’ that is copy (or be incrementally different) from what is in the market successfully making money today, and ‘competing by being different,’ that is competing by differentiation as new. The bias is to be ‘just enough’ different.

Deciding which curve to follow, is the fundamental decision that leaders are required to decide when green lighting a game. It is argued in the thesis that it is the responsibility of the leader to specify what level of quality (value), and what degree of newness each game should have.

The two graphs represent different underlying philosophies. The first graph reflects the more newness the higher the game quality. The second graph reflects a conservative philosophy of ‘just enough.’[134] As mentioned above, in Western Culture there is the bias that more newness is best. There are instances where this is true, where hit games are significantly new to the existing game genre, or are a new genre altogether. These types of game do happen, but they are infrequent. There are also very successful games that are close to Replication. In the previous chapter, C*all of Duty 4* was mentioned as an illustration of a game that was very successful, but did nothing new. It competed and was successful by doing ‘everything’ well ‘There was no new ideas, it was all implementation

[134] It can also reflect ‘this is the best my organization is capable of doing’ in which case there is a different problem.

… not one or two things, everything (15:23).' There are confirmations and exceptions to every generality in the universe of games.

Some product and game domains do not require any degree of newness. Their value lies by being close to Replication. As one interviewee stated:

> *I:* *On the other hand, if you've got a game, you know, like we do a lot of kids games and things. Kids when they play games they're not really looking for innovation, they're not really going to go 'wow this is …' you know, they've played so many games of this, that and the other, they just want to play a game that's got Sponge Bob in it just running around making…*
>
> *wpk:* *Being Sponge Bob doing Sponge Bobbie things.*
>
> *I:* *Yeah, that's all they want, but when the reviewers review this game they go 'oh it's just another Sponge Bob game nothing special'.*
>
> *wpk:* *Right, but the kids aren't going to read the reviews though.*
>
> *I:* *They don't, that's why irrespective of their views it sells a million copies [laughter]. (2:13)*

In the example, the developing organization was meeting the value/quality market requirements and meeting the newness requirements of the market by using the Sponge Bob license.

Given the financial commitments of these large games and the competitive nature of the market, minimizing the risk-ambiguity-uncertainty is a logical strategy, both at an organizational level and the personal level of the decision-makers. This is an argument for producing games in the C3 (Combination) segment of the Continuum, and the corollary not to increase 'too much' the newness of the game, or only as necessary. Combining known elements is the least risky position to take, from both having better-known outcomes from the production process, and knowing the probable market sales projected from current market data. The data from the Sales/Metacritic study in Chapter Three (Video Games and Their Industry) were analysed for type of game for successful games. Of a total 594 games in the database, only 67 sold over 1,000,000 units with a newness type classification:

New Games	15%	
Franchise/Sequels	70%	
Licenses	6%	
Established Genres	9%	(e.g., puzzle game)
Total	100%	

Clearly, the market is favouring Franchise/Sequels. An argument could be made that Licenses and Established Genres are in the 'follow the money' category of License/Sequels, or in the C3/C2 segments of the Continuum. The New Games classification was 15% both in terms of individual games and 15% in total units sold. There was no significant difference in the average unit sales of the New Games (2,187,330 units) compared against the average of the total population of 594 games (2,225,487 units). At this level of analysis there is no clear advantage in targeting the C1 portion of the Continuum, other than to take the one in seven chance of establishing a new franchise – with the subsequent possibility of developing games in the C2/C3 Continuum segment, and there are, of course, significantly higher costs (and risks)

Risk-ambiguity-uncertainty is not only reflected by the finished game's position on the Continuum, it is also an essential part of the creating Modes. Reflecting again on the three critical operating questions of: 'Can it be done?' 'What will it be?' and 'What is the added value?' the answer begins with which Path and Mode to use. Then within the operation of each Mode, there is a constant stream of decisions made, new ideas are introduced, results obtained, and continuing iterations engaged in. With each decision, there is the possibility of error – or total risk in the effectiveness of the decision. From a theoretical perspective, risk-ambiguity-uncertainty of the Creative Continuum begins in the Modes of the Creative Spectrum. The game is the sum of all the decisions made during the development, each one with some possibility of not being optimum. From a pragmatic perspective, the further left the games is in the C3 (Combination) segment (but not too close to R), the lower the risks. These total risks start with the leadership's decision on newness and value, and extend to the colour of the last pixel. The automatic assumption that creativity should be maximized does not reflect the cold reality in which games are developed (as outlined in Chapter Three), nor the same cold reality in which decision-makers find themselves hour-by-hour. It also privileges 'newness' over 'value' (or assumes these are always co-dependent).

The third key finding, using the Model Set as a framework, sheds some insight into the Discovery process.

Discovery is Different

In creative studies at the individual level, understanding chance and intentionality has been an important topic for some time. As Runco suggested:

> The debate concerning the role of chance in creative work (e.g., Simonton, 1988[sic], 2007; Weisberg 2007) is among the most important in the field of creative studies. (2007a:395)

The thesis does not address the mechanisms of the mind at the individual level; however, the operation of the CCM at the organizational level can give some insight into the debate.

In the overall schema of the Model Set, diagrammed at the beginning of the chapter, it was suggested there were two creating paths. The Creating Path from the centre Modes of the Spectrum leads to ideas, products, and games that were in the C3 (Combination) and C2 (Synthesis) segments of the Continuum. The Discovery Path from either ends of the

Creative Spectrum, the Extended Mode 1 (Ideas) and Mode 4 (Serendipity) both lead to the C1 (Unknown) segment of the Continuum. The nomenclature of Serendipity for Mode 4 was carefully chosen to emphasize the random nature of new ideas and possibilities generated by changing current ideas and/or the mix of ideas in the current game in a wild or haphazard manner to see what would result. Again, using my prior analogy, 'Throw the spaghetti against the wall, and see what happens.' If the spaghetti is cooked correctly, it will remain on the wall and be ready to eat. If it slides off, back to the stove to try again. Alternatively, just stumbling across some new idea, which unexpectedly becomes visible as the game develops, is the reflection of the emergent properties of game development. If nothing interesting develops, or the result is a mess, it is ignored. If something interesting occurs – a new idea that makes the game more interesting – the decision can be made to include it in the game. There is no a priori knowledge of what the result of a haphazard and/or random change will be. Equally, there is no a priori knowledge of what new and added value attributes may be found in the emergent process.

Mentioned earlier, as the game matures during development, different aspects or properties emerge that could not have been foreseen prior to execution as they become visible on-screen. In a similar way, the shuffling around and rearranging of ideas in Post-Production has aspects of serendipity, conceptualized in the thought 'Now that I have all the pieces, what do I really have.' One of the underlying concepts of the Creative Spectrum is the continuity or fuzzy flow between Modes and within Modes. As Mode 4 (Serendipity) is a segment of the Spectrum, there are degrees of haphazardness, so to speak, from minor (game emergence) to major (completely unexpected). As the Creative Spectrum continues to evolve along the Serendipity Road, eventually it peters out into nothingness where no amount of haphazardness has any value. Extreme novelty for its own sake has no value.

In an analogous manner, there is a similar haphazardness, and petering out into nothingness at the other end of the Creative Spectrum – Extended Mode 1 (Ideas). At the extreme, it is the familiar concept of brainstorming: record all ideas, make no judgements, the wilder the better, anything goes as far as new ideas are concerned. Then start the analysis and decision-making. At one end of the Spectrum, ideas are the content that is shuffled around, at the other end of the Spectrum, it is the game or features therein, that are being shuffled around. IDEO, famous for brainstorming, has boxes of parts (junk) from prior projects around the offices to stimulate the generation of new ideas to assist in the development of the current project (Kelley 2004). Thus in the operation of the Discovery Path there is an element of randomness in the generation and/or finding of new ideas. In Discovery there is no difference between 'generating by action' and 'finding new ideas by random (wild) search', to add new and valuable ideas to a game. There is no difference in randomly finding an idea from an active search, or passively stumbling across an idea. It is the contention of the thesis that the Discovery Path is so significantly different in process and outcome it needs to be recognised as distinctly different from the normal Modes of the Creative Spectrum. They require the nomenclature of 'Discovery' rather than the accolade and description of Creative. They are part of, but at the ends of, the Creative Spectrum, and perforce do lie within the adjacent possible (cf Kauffmann).

Very much as a generalization, the two Discovery ends of the Creative Spectrum add the unknown 'new' into the C2 (Synthesis) and C1 (Unknown) segments, while the Creating Path adds the 'value' attributes to the creating process. Toward the centre of the Creative Spectrum, the constant element that adds value is iteration. Expressed in another way, it is finding or adding value by doing. It is suggested that the Discovery in Mode 4 (Serendipity) is conceptually and practically more powerful than the Discovery extreme of Mode 1 (Ideas). In the former, two of the three critical operating questions have been partially or completely answered – that is, 'What will it be?' and 'Can it be done?' are already answered, as in both cases the game attribute or feature already exists. These questions remain unanswered in the Extreme of Mode 1 (Ideas).

Discovery is at both ends of the Creative Spectrum. The two Paths accomplish a critical part of finding the 'new' in the creative process and arise in different ways from either end of the Spectrum. From an operational perspective, choosing the appropriate Discovery Path into which to direct the organization's resources in order to solve the current task is a specific leadership/management decision. However, it is the integration of the two Discovery paths into the remaining modes that provides the new in the C2 (Synthesis) and C1 (unknown) segments of the Continuum.[135]

At the individual psychological level, the research is not able to assist Runco in answering his most important creativity studies question. At the organizational group level, a mechanism is suggested that conceptually flows from the Model Set, and at the same time, remains anchored within an overall creative framework that gives some insight. Explored below, Discovery as a process is subject to leadership/management control, even if the specific outcomes are unpredictable. Linking to an earlier argument, here decision-making becomes very important in recognizing which ideas to follow.

The next section turns to the fourth key findings.

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[135] It is suggested, that not recognizing Discovery as a process with two different paths <u>and</u> as an integral part of an overall process, has caused much of the confusion in creativity studies.

Bimodal and Build Model

Detailed in the game process documentation in Chapter Three (Video Games and Their Industry) and confirmed in the interviews; game development is a bimodal process. There was significant creative activity in the early phases of production (Pre-Production phase), and significant creating at the end of production (Post-production phase). In a simple product model, it is expressed as a Create-Build-Create (CBC) product model. By reference, the CBC model illustrates that there were other equally strong product build models. For example, in building an oil tanker or London skyscraper, the model is Create-Build (CB). The final design is completed in the Create phase, and the product is then built from a final set of plans. There can be no significant iterations during the production without enormous time and cost implications, and there is little or no post-production other than fit and finish. A conceptual third model is when the creating and the building occur simultaneous such as in improv theatre, or a jazz performance, – or cases where the product is created by and during the performance: i.e., the product is the process. This model is a Create and Build model (C&B).

In any build process, the ability to build examples, tests, and prototypes to illustrate ideas will prove of value (the CCM at work). This is the iteration process. These three examples are simplified to illustrate the variable nature of the product building process; there are potentially many other examples of different ‘Create’ and ‘Build’ models in the large universe of new and valuable products. The distinguishing feature between these examples is plasticity: how easy is it to change the product during the Production and Post-Production phases? A ‘plastic’ product is easy to change and can be changed up until the moment of completion, a ‘hard’ product has much less ability to change (iterate) once design is approved and asset building starts. It can be generalized the more ‘plastic’ the product the more iteration(s) and hence more opportunity to add value during the development process.

For any project, the commissioning agent's risk-ambiguity-uncertainty judgement will be influenced by the product's plasticity. With a 'hard type process' product, there may be less willingness to move to the right along the Creative Continuum reflecting the increasing unknown added values in the C2 (Synthesis) and C1(Unknown) segments. This is because there is less ability to change during the production. The inability to change (iterate) during production heightens risk. With a 'plastic type process' product the obverse is true. Thus, in a theoretical sense, the more plastic a product, the more risk-ambiguity-uncertainty the commissioning agent should be willing to accept.

However, the type of build process has significant implications on the operation of the CCM. The various modes of the CCM are operating differently in the different phases of any build model. A clear example, is where no new ideas and design iterations can happen without severe consequences (usually time and cost) as a skyscraper is being constructed. This would limit possibilities for Mode 4 (Serendipity), where iteration occurs late in the build process. There are important factors to be aware of surrounding the Build Process during the creative process:

A) The Build Process must be known in order to 'manage,' that is, to make knowingly either changes to the anticipated/planned product or changes to the process of developing the product.

B) The types of decision points (as gates) are significantly different for each of the three examples mentioned above. For a 'hard' product with a Create-Build process, the final approval to start asset production is critical – but somewhat less so in a soft product with a Create-Build-Create build process.

C) Different functions within the overall build process may have different profiles and timing. For example, software engineering may need to develop some art specific code for the artists to draw their characters. This code will need to be frozen without changes thereafter as the artists continue to do their work with a stable code base. A further example is when the structural engineers in a skyscraper design phase need to complete their work, before the air conditioning ducts are planned. There may be Create-Build processes within Create-Build-Create process.[136]

Accordingly, it is important to be aware of the Build Process in any creative endeavour as the various modes of the CCM operate differently in different phases.

Following from the development of the Model Set, f four research key findings have been discussed that flow from the operation of the CCM and the Creative Continuum. The chapter now addresses the implications of the Model Set and the four key findings, first in relation to theoretical creativity research, followed by implications for creative organizations.

Section Four: Implications

The Model Set provides a solid framework for understanding the creative process. There are the four parts to the Model Set: first, it provides a rigorous definition of creativity; second, it articulates the overarching perspective (i.e., Process); third, it shows the Core Creating Mechanism operating along the Creative Spectrum, and lastly, it places the product on the Creative Continuum – bounded by the elements of creativity definition. The first two parts of the Model Set provide the intellectual scaffolding or framework, upon which the remaining two elements of the Model Set then operate. The operating of

[136] This is qualified by the idea level on the hierarchy. The higher the level the more important these consequences become.

the Model Set is further constrained by the Building Process acting as the substrate for the creating process.

The Model Set has implications both for the theoretical literature and for practising managers. Even though the two knowledge streams concern the same subject matter, the goals are different. As a comment from the *Financial Times* expressed it 'While managers value applicability above all else, researchers value logical precision and empirical validity' (Ghobadian 2010). In the following two sections, selected implications of the Model Set will be discussed to show both theoretical and practical implications.[137]

Theoretical Implications

One of the important theoretical implications within the context of the research is that the creating process is not monolithic – that is, there is not only one process. Much of the reported research has the underlying assumption of creativity as a singular process. As discussed, there is a selection of methods (Modes) used in multiple ways (mixes) during the developing process. At the ends of the Creative Spectrum, there are special Discovery Paths of the Creating Mechanism that uniquely generate new ideas. The central Modes of the Creative Spectrum enhance and add value by iteration. Any creating process sits on a variety of substrates – Build Processes – that influence when and how the creating Modes operate during the creating process. The result in the context of the creating process is a game defined by the constraints of value and newness on the Creative Continuum. The creating process is not a unique singular process but is a variety of routes, starting with ideas and ending with a finished game. Treating the process as singular would seem to

[137] Perhaps it should be mentioned again, that this research and thesis is not related to understanding individuals or their mechanisms of the mind.

miss much of the complexity and richness, and short-change our understanding of the process.

All theoretical research in the creating process should first recognize and define the boundary conditions of the work. This should be the perspective or perspectives being taken, and perhaps most important, is the specific definition of creativity which is used. Much research in my opinion is open to criticism, as these primary conditions are not met. All too often, creativity is undefined, and the reported research shifts back and forth between perspectives without identity or continuity of perspective. When conducting creative process research, the applicable Build Process (or other relevant constraints) should be identified, and specifically where in the identified process the research is directed.

In developing theory or developing research observations, a critical distinction is required to distinguish 'for whom' is the value added. In this research, the 'for whom' is clearly known, that is the game developing profit maximizing organization. Too often, creativity is referenced to the product's impact in its domain. An excellent example is Kuhn's paradigm shift, or the creativity of Picasso, where it is the attributes of the product (theory or picture), which make a continuing impact. It is not the individual (Person), the Process, or the Press (environment) that makes the impact, it is the Product. From the product perspective, it is 'why' or 'what features' make the product have 'such' a quality rating, or impact. Having an impact in a domain is significantly different from generating value for the originator or developing organization. The problem is not in the perspective per se, but in recognizing and articulating the identity of the 'for whom' in the research.

One of the significant findings of the research is the dynamic nature of the game development process; the fundamental mechanisms are ever changing during the course of the development. Different processes or Modes were used at different times as the production requirements of the moment dictated. Theory development and field research of the product creative process require the context to be carefully articulated thereby recognizing the work as part of a large whole process. That is, taking slices of the process at any specific time, can only be very narrowly interpreted – and do not reflect the always-changing nature of the process. The extreme example is the continued fixation of the 'one new idea' as the essence of creativity. An additional example is the fixation that 'true or genuine creativity' are always C1 (Unknown) products that always have enormously high impact, without recognition of the larger context of a product continuum.

The dynamic nature of the development process has implications in understanding the study of group processes when engaged in developing creative products. It is suggested that group processes will differ with the different stages in different Build Processes.[138] In turn, they will differ when using the different Modes, and will differ for different products aimed at different positions on the Continuum. Group dynamics will be different in the Discovery Path, from when working in the Creating Path, where they are more focused. In creativity research, this example is described as two different types of thinking: divergent and convergent (Cropley and Cropley 2005:169-70) with the former 'branching out from the given to envisage previously unknown possibilities' (Cropley and Cropley 2005:170) and with the latter converging on a predetermined result. If

[138] Most game projects at the end of development will go into 'crunch mode' where the team will be working under extreme performance pressures to maximize output. The pressure to finish the game on schedule, remove all remaining problems and bugs, and complete as many little enhancements as time allows to the final quality, forces the team into long days and seven-day working weeks. Group dynamics will certainly change.

individuals engage in different types of thinking, groups will most probably do so as well. Extending the line of reasoning, groups engaged in developing C3 (Known) games, will behave differently from groups engaged in C1 (Unknown) games. Thus, the Build Process, modes of engagement, and target position on the Continuum, will all influence group dynamics, and need to be separated and recognized in these studies.

A recurrent theme throughout the research is the importance of decision-making to the game creating process. Whether explicit in the gate points in the formal development process; implicit in comments of the field interviewees; or explicit in the CCM model and its development, any creativity theory fashioned around ideas alone is too narrowly constructed. Ideas are the beginning; decisions are the bridge to execution, and it is the product that adds value. Decisions are not solely the selection of an idea from alternatives as the best idea. Decisions are the commissioning of resources to execute the idea. Decisions not only commit the limited resources of the organization, they involve the reputation of the decision-makers. Every significant decision has some element of possible failure. Decision-making is not only a formal analytical process at the highest levels, it is a messy minute-by-minute process made at all levels of the organization. For every idea generated, there is at least one decision involved, even if that decision is negative. Focusing only on idea generation and idea development is too limiting for theory development. Theory must expand to include the related elements of decision-making as part of an integrated whole framework, or otherwise theory development is incomplete.

Based on the Model Set and significant findings, the above are suggested implications for future creativity research. In the concluding Chapter Eight (Conclusions), suggestions for further research are made that should directly extend the findings of the current research.

A significant amount of creativity research has been conducted to understand influences on the creative process. The implications of the research are now discussed.

Comments on the factors that influence the Creative Process.

It is the suggestion of the research that the 'factors' that influence the creative process are either different or act differently within the different Build Processes, the operation of the Creative Modes, or the targeted position on the C3, C2 or the C1 segments of the Continuum. The factors referenced are not necessarily the overall organizational factors that are pervasive over long periods in the organization, but those factors that can and do change during creative production which are influenced by leadership and management.

To take a specific example, Oldham and Cummings (1996) found that three characteristics of the organizational context – job complexity, supportive supervision, and controlling supervision (negative impact) were indicators of individual creativity as judged by supervisory ratings of creativity. Two examples will demonstrate. In the first example, in a Create-Build process during the Build stage, using a Creating Path to develop a C3 Combination product. An illustration would be the construction stage of a low creative skyscraper (driven by the constraint to minimize costs). A second example would be in first stage of a Create-Build-Create process, using a Discovery Path seeking ideas, striving for a highly creative product, such as the Guggenheim museums in Bilbao (Spain) or in Abu Dhabi. In each case, the job complexity is significantly different, the supportive supervision required is significantly more in the second example, and putting pressure for performance in the first example is accomplished by much higher controlling supervision. The mix is infinite between these two extremes. Future theory on factor research should recognize and accommodate the Build Process, the specific operation of the Modes, and the desired position of the final product on the Creative Continuum. Any research separating out the influencing factors on the creative process needs to separate the various substrates, the Mode operations, and targeted segments on the Continuum, as creating a wide range of conditions in which factors will operate differently.[139] It is suggested that individual factors will operate differently under these different conditions. As mentioned in the introduction to this section, theory, logical precision and empirical validity can thereby be more closely aligned with applicability.

The chapter now turns to the practical implications of the Model Set.

Section Five: Praxis Implications

The Model Set also provides a framework for the practising manager. To a considerable extent, framing the process shows how the process happens in practice – and puts labels on these process elements, providing an understanding and the ability to put the content of the labels into use. Discussing product segments as C3 (Combination), C2 (Synthesis), or C1 (Unknown) adds some degree of precision to any discussion. To some considerable extent, an identified framework and named process, demystifies the creating process. By suggesting a very specific meaning to creativity that leaders and managers can relate to, much of the cultural fog that surrounds the creativity concept can be cleared. Of some considerable critical importance, is the fact that it shows practising leaders and managers that they have 'some' element of control over the creating process. They can achieve this by being explicit on the definition of creativity and showing how elements of the CCM can be manipulated for desired results. The following section covers three operating implications addressing the practical application of the Model Set. First, is an examination of the role of leadership in the operation of the Model Set. Second, the

[139] For example Shalley and Gilson's *What leaders need to know: A review of social and contextual factors that can foster or hinder creativity* The Leadership quarterly 15 (2004) 33-53, is 'only' a list of factors.

tension between the idea element and the execution element is dynamically manageable. Lastly demonstrates how the CCM can be used as a toolkit to manage the creative features during the game production.

Leadership Implications

The organization's leadership is responsible for guiding the organization through the intensively competitive and high-risk environment outlined in ChapterThree (Video Games and Their Industry). The organization in order to survive must meet its profit and cash flow obligations. These profit and cash flow objectives are the ultimate constraints on any game development project.

Within the framework of the Model Set, the organization's leadership is responsible for ensuring the two fundamental constraints of value and newness are established for any game. Specifically these constraints are specified as the required Metacritic rating (ensuring unit sales requirements) as the value constraint, and what relative degree of newness (risk-ambiguity-uncertainty) that is appropriate for the team and organization. The feature list will be defined in Pre-Production and include those features that will be new to the field and domain. The leadership does not necessarily set the new and value added constraints, but working with the development team in the early planning stages, may iteratively work towards defining and agreeing the required constraints. Features and objectives may thus be discussed (negotiated) with the team because of time and cost constraints.[140] As also outlined in ChapterThree, there is a great deal of additional planning involved.

[140] The organization's leadership must ensure that the team 'commits' to meeting the agreed game objectives. This involves getting the team's 'buy-in' to the objectives they will meet. Having the team involved in setting the objectives is more effective than using top-down edicts.

As mentioned previously, leadership is also concerned with the three critical operational questions – 'Can we do it?' (Can the organization deliver on time and on budget what it sets out to do?), 'What will it be?' (Will the game be what we set out to do, and will it have the desired features?), 'What value will it have?' (Will it meet the quality Metacritic ratings, and meet the required sales levels?). These are risk assessment questions that will require leadership decisions, as it is at the most senior levels that these decisions can be decided. As one senior manager, Theodore, relayed a discussion with one of his managers:

> *Yeah and me and Joshua used to argue about this … and one of the arguments we used to have was 'Theodore we should be pushing for that eighty-five' and I'm like 'Yeah but we push for somewhere we can't achieve and we die, we know we can do this, it's a business decision, it's strategic'. So you're right but then you get the gigs that only need the seventy-five and this is what we used to argue about, he's like 'Well maybe if we got a gig that needed to be eighty-five we'd be able to push and push ourselves and get there' and I'm like 'I'd rather push to be more efficient and make more money that way … (15:13)*

Theodore was specifying that his studio should develop seventy-five point games as a strategic positioning decision.[141] Not only is the quality level important for individual games, but there is a significant strategic element involved at the highest organizational levels. The following is not an exhaustive list, but some of these strategic implications are:

A) Setting the risk level for the organization. Not only strategically against the competition (necessitating having the required resources to compete), but also required is a risk assessment of the organization's capabilities to deliver.

B) Setting the internal cultural standards that are expected to be met for the products. The cultural expectations such as 'We are the kind of company that does 85-90 point games.'

[141] This senior manager also mentioned that his studio only had to deliver 75-80 Metacritic ratings for those games with licenses to be strategically successful.

C) Setting the competitive path. Is the organization going to compete by incremental improvements to current products and staying in the C3 (Combination) Continuum segment (as a fast follower), or is the organization going to strive for C2 (Synthesis) and C1 (Unknown) games. A franchise strategy or licensing strategy may also be involved in this strategic decision.

D) Setting the development path of the organization. Studios may need to learn to walk before running, that is, develop C3 (Combination) games before setting out to develop C2 (Synthesis) games, and certainly before tackling C1 (Unknown) games.

E) Setting the quality level that attracts necessary talent. Studios that deliver quality C1 (Unknown) games will be in a better position to attract the required talent. Individuals like to join teams that are doing interesting cutting-edge development projects.

It is the organization's leadership responsibility to set the creative constraints for these games, or to see that they are established. These constraints are defined: 'value' via the Metacritic rating, and the 'new' via the complete feature set approved at the end of Pre-Production. These constraints are those against which the Decision element of the CCM will refer during production. Additionally, it is the leadership's responsibility to make the risk assessment prior to making the green-light decision to proceed, that the organization can meet its time and on budget requirements.[142] As shown in Chapter Three, most games do not meet either the quality ratings and/or required sales to be profitable.

From the perspective of the Model Set with a somewhat stylized organization chart, the relationship with the management level could be represented as:

[142] This risk assessment is both internal; can the organization deliver, and external; what are the external factors such as anticipated competition, technology change, and changes in a player's tastes in the various market cycle points.

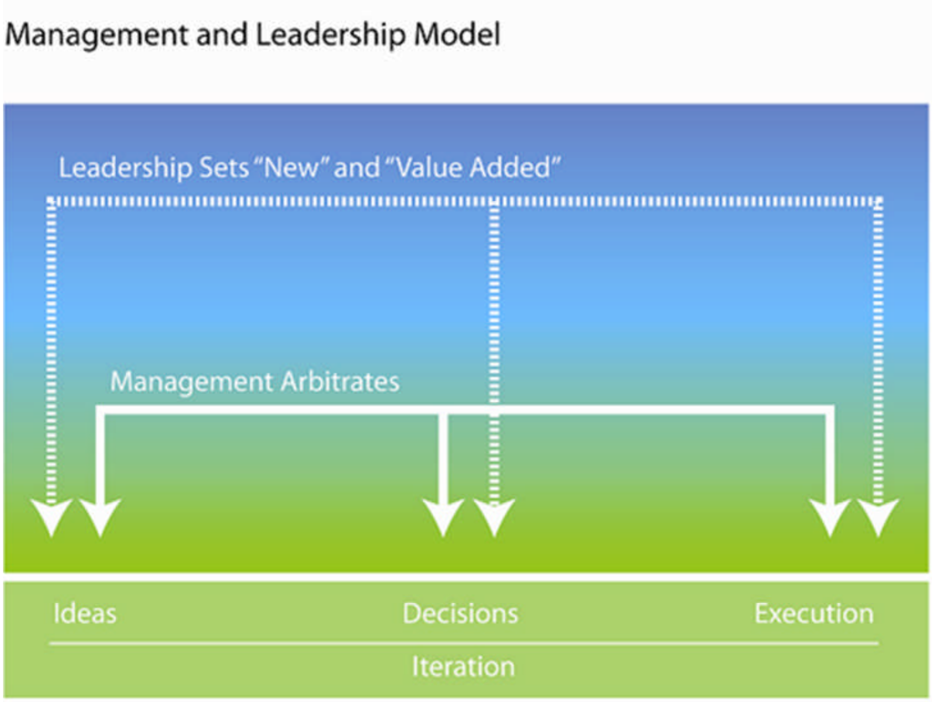


Figure 7 Management and Leadership Model

The above figure illustrated the different responsibilities of the leadership and management functions. It is the responsibility of leadership to set the "New" (as Ideas) and "Value Added" (as the required Execution) constraints of the development project. The leadership function does not necessarily set these constraints, but must insure that they are defined for the projects. These constraints are the reference of the management function in the arbitration between the ideas and the execution elements of the CCM.

With the appropriate risk assessments, the organization's leadership[143] ensures that the creative constraints are established and that the appropriate resources are available. At the management level, the CCM's four elements operate and the balance is maintained by management between the Idea element and the Execution element to deliver the game on time and on budget.

[143] This model greatly simplifies the overall tasks of the leader.

Developing games is an emergent process; new possibilities arise during the developments that were not visible earlier. It is more true for games targeted towards the C1 (Unknown) Continuum segment than games targeted towards the C3 (Combination) segment. One might go so far as to say that the whole point of C1 (Unknown) game development is to allow creative alternatives to emerge. In setting the new and value constraints, the organization's leadership needs to be aware of the possibilities of emergent properties, and make changes as necessary to the original constraints. If new features emerge that will significantly affect the value (i.e., Metacritic rating and subsequent sales), budgets and timelines may need to be adjusted. This, of course, is a two-edged sword. If required new features are not emerging, then the decision may be to terminate the development. It is leadership operating in Mode 3 (Creating Mode), making the decision for iterations to continue as perceived newness and value increase, or making the decision to terminate the development when the iterations do not.

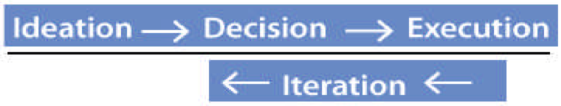
The above comments bring under a great deal of suspicion the common cry 'Take more risks, be more creative!' Is the request for C3 (Combination) product features, or is the request for a C1 (Unknown) product? Is the request asking for both high 'new' and 'value added' elements or is it a one-sided request for a game that will just sell more units? Alternatively, is it a trap being inadvertently set up with resources[144] available for a C3 (Combination) product, but with a requested C1 (Unknown) desired. Highly 'new' and 'high value' (C1) products require a significantly higher resource level, including a larger risk-ambiguity-uncertainty tolerance. Understanding the CCM and the Continuum, may assist in solving the underlying problem in these situations.

[144] This is all the resources necessary to accomplish the desired development: material resources, talent, and a culture that allows some degree of error and experimentation (iteration).

To some significant degree, the organization's leadership and management have some amount of control over the creative level of the development teams, both in setting the initial game creativity requirements, and in managing the development process using the tools of the CCM. However, there does remain the formidable task of execution, getting the game completed on time and on budget.

<u>Organizational Tension in Real Time</u>

A significant research finding that can greatly influence the creating process is in the workings of the CCM. There is a fundamental tension between the Ideation element and the Execution element:



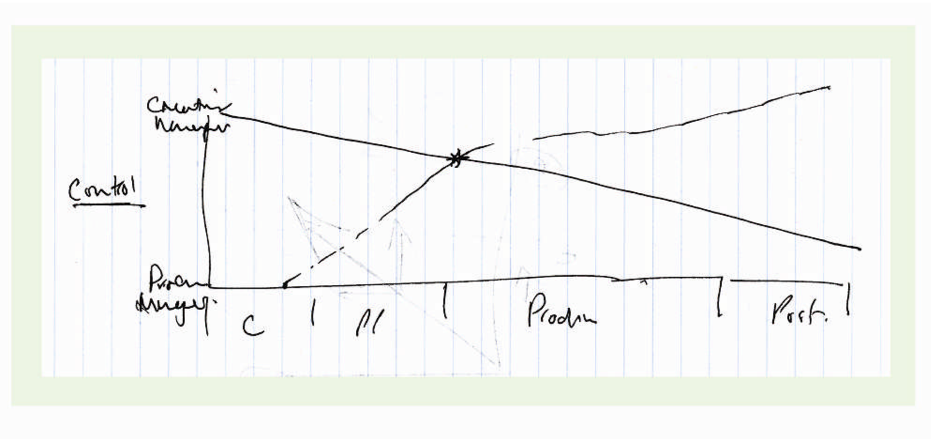
The tension finds expression in the organization with individuals in these roles: the Designers generating ideas and Producer ensuring the game development is kept on time and on budget.[145] The tension was clearly seen in the field research and reflected in the interviews in the prior chapter. From a theoretical research perspective as Eikhof has stated:

> Throughout creative industries research, it is assumed that there exists a putatively conflicting relationship between art/creativity on the one hand and business/management on the other. (2007:523)

The underlying tension has been noted by many other researchers (Lampel et al. 2000, Reid and Karambayya 2009, DeFillippi, Grabher and Jones 2007). Eikhof goes on to say 'The common claim is that art/creativity and business have to be balanced or integrated (2007:523).' The research has indicated that it is not necessarily appropriate at all times

[145] In game development organizations, Design (Idea) function and Production (Execution) functions are arranged organizationally in multiple ways. In some organizations, either one is in charge of the development efforts. In some organizations, they are on an equal basis, reporting to a senior manager. In other organizations, the formal relationship is determined by the dominant personality. For clarity of exposition, this discussion assumes that Design (Ideas) and Production (Execution) are on the same level reporting to a senior manager.

during a development project. The balance between these elements in the personification of Designers and Producers can be influenced (or more strongly directed), by the group or team management above them. Whatever the formal relationship or balance between these individuals, management may favour the influence of one or another at different phases in the development. As noted in Chapter Four (Literature Review), Drazin et al (1999) reported in a large aircraft development project (the Boeing 777 project), that as various crises arose the power shifted between the managers (the business) and the engineers (the creatives) to solve the current crisis. The same shift in power and influence in making decisions can occur in game development. One senior manager drew it as a graph, showing the balance of control shifting from the Creative Manager to the Production Manager going into the Production phase of development (25:15). What was also interesting was that he did not see the Production manager having any influence until significantly into Concept development. The horizontal axis is Concept (C), Pre-Production (Pl), Production and Post-Production (Post).



Drawing 3 Balance between Creative and Production Management

Thus management not only influences who assumes the roles of Chief Designer and Producer with control of the type of individual (for example Kirton's 'Adaptors' or 'Innovators' (2003) or Galenson's 'Experimental' or 'Conceptual' individuals

(2006)[146]) but additionally has the ability to influence the power of these roles during the development. Not only does management influence the power relationship between the Designers and Producers and who has the final call in making the on-going decisions, the manager has influence on the tension between the two individuals. If there is too little tension, not enough new ideas are being generated and executed to push the game forward creatively – that is, towards its desired position on the Creative Continuum. If there is too much tension, once again creative ideas are not coming into the game to push the game forward into new ground. In either extreme case, it is the responsibility of management to increase the tension in the former example, and reduce the tension in the latter. However, more critically, it is the management's responsibility to ensure that there is the appropriate level of tension, at the appropriate time, that is right for that context. As one of the interviewees expressed the decision-making shift during a development:

> *So the decision-making was made on a creative basis early on and near the end the decision was made on a production basis but we were still doing lots of creativity. (23:14)*

The tension between the creative idea function and the business execution function is considerably larger and more complex than I have indicated above (for example see Isaksen and Ekvall 2010). The basic tension exists between individuals, within teams, and within the organization. Ford and Sullivan nicely captured tension at the organization level:

> *One of the most significant implications of applying an evolutionary view of creativity to organizations is that it focuses on variation and selection retention processes that are inherently at cross purposes with one another (Weick 1979). Specifically, as individuals, teams, organization, or industries become increasingly adapted to previously retained variations, the motivation and ability to generate and select new variations (creative alternatives) declines. Variation processes (e.g. brainstorming, experimenting, etc.) are more likely to generate a wide range of novel ideas when selective retention processes (e.g. memory, routines, norms,*

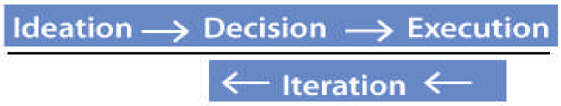
[146] In some organizations and teams, this may be to a limited extent, as both producers and designers are on permanent team staff.

standards, etc.) place few constraints on individuals thought processes. Alternatively, selective retention processes are likely to align collective thought and behavior into efficiently organized and synchronized patterns when novel disruptions are few.(2005:246)

In summary, there are a two points that require noting: first, congruency between the CCM model and the field interviews. The interviewees were very aware of the underlying tensions. The second point is that the tension is dynamic and changes during game development, with the corollary that management has the both the responsibility and ability to dynamically change the tension relationship.

The creative tension finds different expression in the different Build Models, the fifth significant research finding.

CCM as a Tool Kit



As noted earlier, the CCM and the Modes are able to act as a toolkit for managers. By toolkit is meant that the various process are available for use by the organization both in the formal planning process and as needed during production to solve problems. The manager has control over and can instruct the use of elements of the CCM and use of the Modes. Ideation is an integral part, if not essence, of the Pre-Production game design planning process. Brainstorming sessions, as an example, can be a source of ideas at any time during the development, as the route to solving problems. The decision-making process is amenable to management control and influence. Options range from the establishment of formal 'chain of command' systems for specific types of decision, to the establishment of elaborate detailed and formal decision procedures that are required to be followed. Numerous soft influences are available such as staffing the team with experienced members, who are better able to make decisions, to establishing a culture of thinking before acting (stop shooting from the hip), to the examples set by the senior members of the organization.

Execution is the application of resources under management control to get the game developed on time and on budget.

Iteration as a process is subject to significant management control. The range is large as it can be used as a control of quality: going from 'stop' that is good enough, or as an instruction to 'continue to improve, that is it is not good enough yet.' Iteration can be part of a problem solving process, where various new ideas are tried out (variations), along a solution path. Thus, the four elements of the CCM are useable as an instruction set (ideate, decide, execute, iterate).

The six Modes are also useable as discrete management instructions to group and team members. Possible instructions can be issued as follows:

Mode 1 (Ideas)	As an instruction to generate new ideas, that range from the wildly unconstrained (Extended), to incremental to an existing set of parameters. As an instruction to think about the consequences if a specific idea were implemented at this point in the game. Alternatively, what are the consequences if 'this' is combined with 'that'?
Mode 2 (Target)	As a simple instruction: 'Go implement the idea, and show me the result.'
Mode 3 (Creating Mode)	As an instruction to try a set of variations to determine the most appropriate.

Mode 4 (Serendipity)	As an open-ended instruction to go and see what happens when various alternatives are experimented with.

These may not be the full set of operating instructions available to a manager, but from a creative process perspective to generate new and value added ideas, they do represent a powerful set of tools. At the nitty gritty interface, or where the tyre hits the road, the critical questions are: which Modes are to be used, when, by whom, and for what result? The result of these Modes is either an idea that may be implemented, or an idea that is expressed through its implementation. Again, it is the management decisions that answer the questions just posed (which, when, by whom, what result?), and the choice of which idea to implement. Decision-making drives the creative process.

As suggested previously, it is the leadership responsibility to set the constraints of new and value added. In setting the 'new' constraint on the Continuum, there are implications on which Modes will be required to accomplish specific tasks. Going to the extremes there will be different Paths used in developing C3 (Combination) games, than when developing C1 (Unknown) games.

Conceptually, ideas used in C3 (Combination) games can be managed. The outcomes are somewhat predictable, that is, the risks as a set of defined probability outcomes either are known or can be determined. In development, Mode 4 (Target) will tend to be a highly used Mode, as the required outcomes have been established.

In the development of C1 (Unknown) games, the ideas cannot be managed, as they are generated by the Discovery Paths by using the Extended Mode 1 (Ideas) and by Mode 4 (Serendipity). In these cases, the emphasis is more on controlling the process, than attempting to control ideas. Mode 3 (Creating Mode) is the controlling Mode, as there is management control over the number of iterations. There will be a difference in total time taken to develop a C3 (Combination) than a C1 (Unknown) game. As one interviewee expressed it when referring to the length of development time and the number of iterations:

> *Basically the difference between the C3, C2 and C1 project is how many iterations you're going to need, how close are you going to be from your target on the first iteration. By having examples of people having done it already, you limit your set of things that you're going to need to iterate a lot to various small things. On a C1 product, you're going to have to iterate the whole product … You might take everything, chuck it in the bin and start again from scratch because the whole concept was wrong. So that's why with C1, C2 and C3 type of product require different lengths, is because of the iteration of it, number of iterations. (29:8)*

Creativity as new and value added is not a wild unpredictable unmanageable process, but to some considerable extent is under leadership/management control. Leadership sets the key constraints, and managers have considerable control over the creating process. However, this does not minimize the enormous task of actually building the game to the planned and/or approved features and getting it shipped on time and on budget.

SUMMARY

The chapter has set out to answer the question 'What are the implications of the Model Set and the four key research findings?' In addition, what are the praxis implications? A central conclusion of the research is that creativity from the perspective of the creative process, both in theory and in our widely held cultural perception, is much more than ideas. Ideas are the start of the creative process, but focusing on that element does great disservice to the full complex creative process. The backbone of the creative process is the decision-making process. Decisions are the enabling factor that drives the creative process forward. Iteration takes the process to conclusion. Leadership and management of the creative process is not a credo to maximize creativity, but to select those features of new and value added balanced against the appropriate risk-ambiguity-uncertainty boundaries of the organization, appropriate to the targeted market.

The creative process is not monolithic, but after setting the appropriate constraints, the interaction of the Creative Spectrum with the Creative Continuum generates an infinite number of combinations. These combinations are under the influence of the organization’s leaders and managers, and can be changed, modified, and corrections applied, during the dynamic creative process to improve the outcome and deliver the game on time, and on budget.

CHAPTER EIGHT

CONCLUSIONS

> Competition in cultural industries is driven by a search for novelty. However, while consumers expect novelty in their cultural goods, they also want novelty to be accessible and familiar. (Lampel et al. 2000:266)

Introduction

The chapter starts by briefly summarizing the thesis' earlier chapters. In addition to the Model Set, the four key research findings, and the three operating implications, three themes have threaded their way through the thesis: the tension between 'new' and 'adds value', the centrality of the decision-making process, and lastly the key responsibilities of leadership in setting the constraints of the creating process. How these themes all come together in the Core Creating Mechanism is presented.

Further research directions are suggested in three areas: first, fundamental cross-domain theoretical research between the creative process and the decision-making process. Additional research recommendations are secondly, to extend the finding of the Model Set into cross-domain environments (e.g., film, TV production), and lastly, in-depth research on the operation of the Model Set. Unanticipated results – surprises – found during the research and thesis development are mentioned. The chapter closes with a review of the findings against the research question, and concludes with an assessment of how well the task was accomplished.

Chapter Summaries

> What are the central elements of the creative process, or processes in game development companies? When, how, and where do these elements work most effectively?

A mature industry executive conducted the research question of the thesis. Certain ontological assumptions are foundational to the research; that creativity is an everyday cognitive process, a combination of basic mental capabilities, are the result of hard work and mini-insights, and are domain specific – usually obtained after extensive experience. In addition, and perhaps most importantly, anyone can be creative. The thesis results are limited to the creative process in a project environment, as opposed to an on-going production processes environment. My general business and industry experience were invaluable in conducting the field research, but may have their own limitations. The Grounded Theory Method's (GTM) philosophy was the principal approach taken in the field research, conducted in four studios in two major game companies over eleven months.

The research contribution to knowledge is a four-part Creativity Model Set with four key research findings, which have theoretical and practice implications. Starting from a working definition of creativity, constrained by a Process perspective, the Creativity Model Set proposes a Core Creating Mechanism (CCM) that operates in four Modes to produce a product that is positioned on the Creative Continuum. The Creative Continuum is a reflection of the creativity definition components of 'new' and 'value added.'

An analysis of the video game business outlined the operating and financial fundamentals, and highlighted the large financial risks involved in game publishing. An independent on-line organization, Metacritic.com provides the industry quality ratings. In a study, these ratings were found statistically related to game revenues – the higher the ratings, the higher the revenues. Additionally mentioned were those cases where 'good enough' newness and value is effective: e.g., kids' games, movie spin-offs. A process of stage-gated decisions upon the completion of certain production milestones controls the production of these large games. The risks involved; financially for the publishers, and for the individual reputations, are extreme.

A working definition of the creative process for the research context was established, and the components critically discussed. The theoretical literature was then reviewed. Foundational theoretical models – those of Campbell (1960), Simonton (1999) (influenced by Campbell), Sternberg (1999), Drazin et al (1999), and Csikszentmihályi (1999) – were outlined. The thesis's central concept is derived from a Darwinian model of blind variation, selection, and retention (BVSR), re-interpreted into Ideas, Decision, and Execution, enriched by Iteration. The Core Creating Mechanism was deconstructed into two paths, a Creating Path and Discovery Path, and into four operating Modes, reflecting differences in practical application. The Creative Continuum was segmented to label and describe different degrees of newness and different degrees of quality/value. The Creative Continuum suggested that there were understandable degrees of newness from the combination of ideas. These combinations ranged from two known ideas (C3, Combination), the combination of a known idea with an unknown idea (C2, Synthesis), or the combination of two unknown ideas (C1, Unknown). The fundamental aspect of decision-making became clear in the creating process, even though it is subject to a number of practical operating errors. Critically, only by decisions selecting and sanctioning the actioning of ideas, does the creative process occur.

Selected comments from interviewees provided illustration and depth to the Model Set and key research findings. Interviewees particularly commented on a number of these findings: the bimodal nature of the game development process, the dynamic tension between Ideation (creative) and Execution (production) in the organization, and the critical nature of the organization's leadership in establishing the creativity constraints of new and value added.

The last chapter addressed the implications of the Model Set and four key research findings, related these to the current theoretical constructs, and outlined specific operating implications. There is no single creative process: there is a range of creative processes delivering a range of creative products. Any analysis of the factors influencing each creating process, must recognize different build processes and the different phases in the building process, and understand these differences. The chapter outlined the three operating praxis implications of the Model Set – it is the responsibility of the organization's leadership to ensure that the creative constraints of 'adds value' and 'newness' is set for the game. The tension between the idea element and the execution element (commonly the 'creatives' and the 'suits') is a dynamically manageable process. The lastly the modes of the CCM may be used as an operating toolkit.

The summary chapter now addresses the three main themes that flow through the research findings.

Themes

In addition to the Model Set and findings, three themes have woven their way through this discourse. The first is the distinction between, and tension between 'new' and 'add value.' The second theme, creativity requires more than ideas, decisions are equally fundamental, was already noted in the key findings. These two themes are part of the four key findings. Lastly, the organization leaders have a critical obligation in setting the fundamental creativity constraints.

In a working definition of creativity for the research context, new and add value were the critical elements, or attributes. New was interpreted as ideas, that when executed became either completely or in part, a valuable (monetized) game. The CCM operationalized the elements, with four basic variations, as the mechanism that converted ideas into products. These products were then positioned on the Creative Continuum, with the vertical (ordinal) axis reflecting value, and the horizontal axis (the nominal reflecting) newness. When operationalized in a production setting, new and adds value, were institutionalized in roles of the design or creative individuals (creatives, generating ideas), and the production individuals (suits, concerned with timely production within constraints). Management mitigated the tension between the two constructs.

The second theme reflected in the thesis and as one of the key findings, is that creativity is not only ideas. Decisions operationalize ideas, releasing the idea into action. One does not exist without the other. From the impetus to put an idea into development, through the operation of the CCM, to the colour of the last pixel, decisions are the releasing factor. This is in vivid contrast to the commonly accepted idea that creativity is all about ideas.

The third theme, residing at the highest organizational level in the leadership function, was suggested as having the responsibility for setting, or overseeing the setting of, the two elements of new and adds value as constraints: as a quality rating of the ideas (as a Metacritic rating), and an acceptable degree of newness as a feature set. These constraints were the ultimate reference for all decisions taken during the creative process. These constraints also found reference in the ultimate constraints, the time and cash project budgets.

These three themes are deeply entwined. Together they are the individual strands of the Darwinian BVSR theory, separated for observation and discussion, but inseparable in practice, as the creative process. These three themes are the creating process. As Cziko expressed it, this is '*the*' Universal Selection Theory (1995); or as articulated in the thesis, the CCM. The tension between new and added value, is the tension between variation and selection. The difference between a pure Darwinian Theory with blind variation and the CCM is that individuals make decisions on which idea as variation to select, as opposed to the naturalist blind selection. Decision-making is at the centre of the creating process. It is the correct selection and implementation of ideas, and their iteration, that is the creative process. The tension between new versus value is mitigated by decisions. Decisions are referenced to, and bounded by the creative constraints set by the organization's leadership.

Thesis Limitations

Mentioned in Chapter 1 were three broad limitations to the thesis. The first was that the research was limited to the choice of large entertainment software projects. Suggestions for additional research addressing different production types (i.e., continuous productions, and different build process) in different domains are articulated below. The second limitation was choice of perspective. The chosen perspective was of the 'creative process' as opposed to the 'creative individual,' or the 'creative product' (e.g., what specific attributes indicate that a product achieves the accolade 'creative' in a specific domain and time), or the 'creative environment (Press).' In part, this perspective was a result of the working creativity definition developed, and the desire to develop a set of underlying models. The perspectives of Person, Place, and Press are so fundamentally different from that of Process that it is problematic to suggest additional research leveraging directly from the finding in this thesis. However, having taken that position, there might be potential for some interesting findings that examine the operating utility (in the broadest sense) of creative Persons using the Core Creating Mechanism. Again, there might be potential for some new findings examining specific product attributes using the framework of the Creative Continuum. These two potentials take elements of one fundamental perspective – the model elements of the process perspective – and examine them within the framework of a different perspective. The third broad limitation derived from one of the strengths of this research, in that it was conducted from the viewpoint of a highly practiced domain individual, reflecting my ‘experience, training, cultural biases, current trends, personal values, and idiosyncratic preferences’ (Csikszentmihalyi 1999:314). These latter limitations are eroded by continued exposure to, and experience in, the entertainment software development domain, and interactions with the talented individuals who work therein.

Future Research

The following are suggestions to extend the findings of this research to further understand the operation of the thesis’ findings. Three areas of research are proposed. At the highest level, it is necessary to develop our understanding of decision-making in the creative process, as it is so fundamental. Ideas are impotent until operationalized by the decision to execute. One does not proceed without the other.

The research findings should be extended into other domains (i.e., film), and other build environments to understand the context difference and sensitivity. Research into other domains would begin to address the question of the universal robustness of the models.

Lastly, further research should be conducted in other game development environments to refine further the understanding of the operational modes of the CCM. That is, to address the effectiveness of the individual modes in the various build stages of game development.

These three research suggestion are:

1. **Fundamental Research**

The area of fundamental research required is in the integration of the fields of decision-making and the creative process. The thesis found that the formal decision-making process and formal creative process were mirror images of each other, the difference being in the unit of analysis and process segmentation. In large part, the theoretical literature has subsumed decision-making as an integral part of the ideation process, whereas the position of the thesis is that they are two different elements operating in the CCM. Not only is decision-making the selection of ideas, it is the releasing of the resources to operationalize the ideas. The factors that influence the creative process have been articulated at the individual, group and organizational levels (Shalley and Gilson 2004, Anderson et al. 2004). However, they have not been integrated with the factors that influence the decision-making process. As Kessler suggested 'there is a pronounced lack of communication between the two literatures … there has been little meaningful dialogue or the utility of applying the findings of one area to the other.' (2004:276). These two literature streams need to be brought together to more fully understand both, with the possibility that the combination may deliver a new creative C3 (Combination) concept.

2. Implications of the Model Set to Other Domains

The operation of the Model Set should be researched in other organizational domains, in order to find similarities and differences within a game development context. For example, film production should be researched, a domain that has many similar characteristics to game production, and is a popular mass-market product. Film has long been recognized as a creative domain, driven by new ideas. The production characteristics are almost identical with Pre-Production (planning), Production (filming), and Post-Production phases (editing). One major difference is that films are made with temporary workforces assembled for each film, whereas fixed in-house workforces develop games.

The Model Set should be researched in different Build Process environments. The thesis has identified some additional variations (e.g., Create-Build, or Create&Build), which variation may provide for different insights into the operation of the Model Set. The research area of this thesis has been large single product projects. Additionally, process–production environments should be studied, rather than a single project environment. Two examples: first, environments that have long production runs of a single product (e.g., automobiles), and secondly, environments that have many short production runs of unique products (e.g., prototype machine shops). Research along this line of inquiry begins to address the universality of the Model Set. Of critical nature along this research path is understanding the congruencies and differences in these different domains – whether they are fundamental or of degree only.

3. Specific Model Set Research

The individual Paths and Modes of the CCM should be further studied in different game development environments to understand further their operation. Examples of specific research questions might be:

a) How often are the individual Paths and Modes used in each development phase?

b) Are the four Modes the most appropriate way to segment the Creative Spectrum, or are there segmentations that are more effective? Is the difference important, and why?

c) What is the most effective Mode – when (which conditions) and why? Conceptually, it is more cost effective to generate/discovery ideas in Modes 1 (ideas), than in Modes 3 (CM) or Mode 4 (Serendipity). That is, it is more effective to have people think, rather than it is to build the idea as a prototype and either iterate or stress for discoveries? Which delivers the highest value, and why?

d) What are the unique individual conditions of the Discovery Path and Creating Path? When and why are each most effective?

e) Video game development is in an idea-rich environment. What are the differences in operation of the Core Creative Mechanism in an idea-poor environment? Of particular importance is the operation of the decision-making element.

It would be productive to study the application of the Model Set to the full twenty-four to thirty-six month development cycle of a single game, from the initial idea and approval-decision, to the decision on the last pixel colour prior to shipping.

In extending research into these three areas – foundational question, extending the Model Set into other domains, and additional operational research on the Modes – two questions are being pursued. How universal is the Model Set? Is it *The* Universal Selection theory as Cziko (1995) suggests? What are the differences in operation in different domains, and under what conditions are the Paths and Modes most effective?

Surprises

A number of surprises occurred during the field research, and subsequent analysis. The first was the bimodal nature of the creative process in game development. It challenged an unarticulated assumption in creativity research that the creative process was always at the 'front end'. The second was the different Build Processes that implied much of the research had only looked at one condition, opening up the possibilities of different research conclusions under different Build Processes. The third surprise was the role of great talent in organizational creativity. The organizational research (Zhou and Shalley 2008) all but ignores the role of great talent in its factor analyses; the field was extraordinarily articulate on the impact of the creative individual, as noted in the field interviews.

CONTRIBUTION TO KNOWLEDGE

The thesis makes a contribution of knowledge in a number of areas. From an academic perspective, there are four key contributions.

1. Explains the importance of decision making in the creative process.
2. Challenges the assumption that the more the creative content the more valuable the final game.
3. Delineates the difference between, and the interconnection of, the creative process and the discovery process.
4. Defines multiple creative processes that relate to different contextualises.

From a praxis perspective, the thesis articulated that leaders and managers have some element of control over the creative process. Of critical import, leaders have the responsibility to see that the critical constraints of value and newness are defined for these large expensive video games. These constraints are specified as the required

Metacritic rating (ensuring unit sales requirements), and what relative degree of newness (as risk-ambiguity-uncertainty) that is appropriate for the team and organization.

In an operating context, there is a tension existing between the idea and execution elements of the CCM, usually seen as the creatives and the producers in the organization. The resolution and dynamic management of this tension is the reasonability of the managers of the organization.

Some element of control of the creative process may be achieved by understanding and using the elements of the Core Creating Mechanism (CCM). Operationally, the four modes may be used as discrete management instructions to group and team members. Possible instructions for these Modes could be:

Mode 1 (Ideas)	As an instruction to generate new ideas, which range from the wildly unconstrained (Extended), to incremental to an existing set of parameters. As an instruction to think about the consequences of a specific idea implemented at this point in the game. Alternatively, what are the consequences if ‘this’ is combined with ‘that’?
Mode 2 (Target)	As a simple instruction: ‘Go implement the idea, and show me the result.’
Mode 3 (Creating Mode)	As an instruction to try a set of variations to determine the most appropriate.
Mode 4 (Serendipity)	As an open-ended instruction to go and see what happens when various alternatives are experimented with.

CONCLUSION

The research was initiated to answer, and the thesis to summarize the findings, of the following research question.

> What are the central elements of the creative process, or processes in game development companies? When, how, and where do these elements work most effectively?

Additionally, the research was to answer a personal question of creativity relating to my previous work as an agent and business affairs manager for independent game studios. The central elements of the creative process were found within the development of the Model Set, and the five key findings. These Models do give insight into, and an understanding of creative game development. The 'when, how, and where' question was largely answered, as the how and when do the 'elements work most effectively' is part of the suggested future research. The research and the thesis writing have answered the personal question relating to my prior work.

APPENDIX A

Statistics for games ratings and user scores

Data

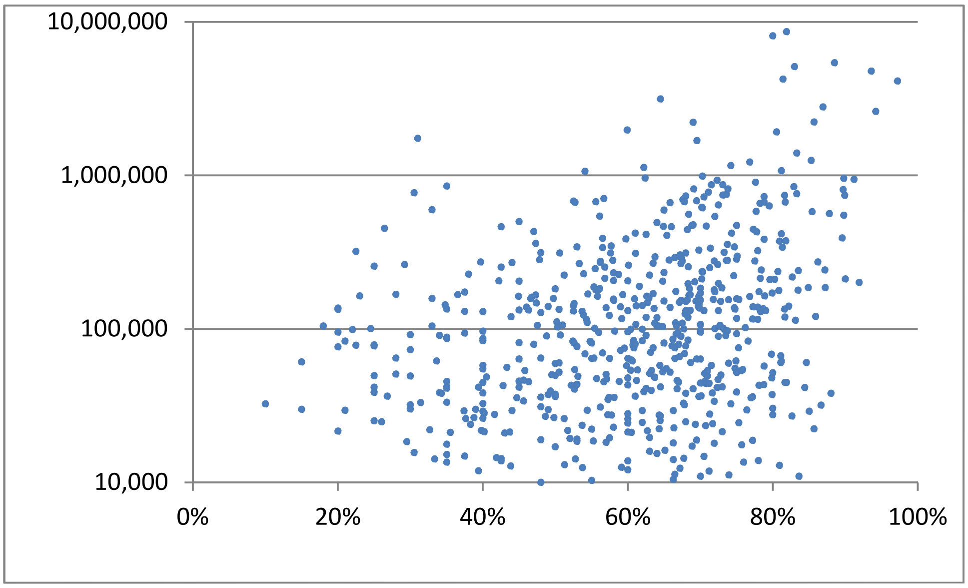
For each of the three platforms (Wii, PS3, and Xbox) data has been collected on total sales and user scores for individual games. When these are plotted together as simple scattergrams, it is clear that there are differences in association that are dependent on platform. Further, by plotting simple frequency plots of numbers of sales it is quite clear that there is considerable skewness in the data, i.e. there is a long right-hand tail, or the vast majority of sales fall below half a million, but some extend to several million. To counter this, it is useful to look at the logarithm of the number of sales. This is a standard method for reducing skewness in the data, but also makes the statistical analysis more realistic.

Statistical methods

For each platform, the correlation (a measure of association) is calculated for the logarithm (to base 10) of numbers of sales and the per cent user score. This association is a symmetric measure in the sense that it does not attribute causality, i.e. it does not assume dependence of one variable on the other or vice-versa. It simply comments on the association and provides a statistical test of whether the association is significantly different from zero, i.e. randomness, or no association.

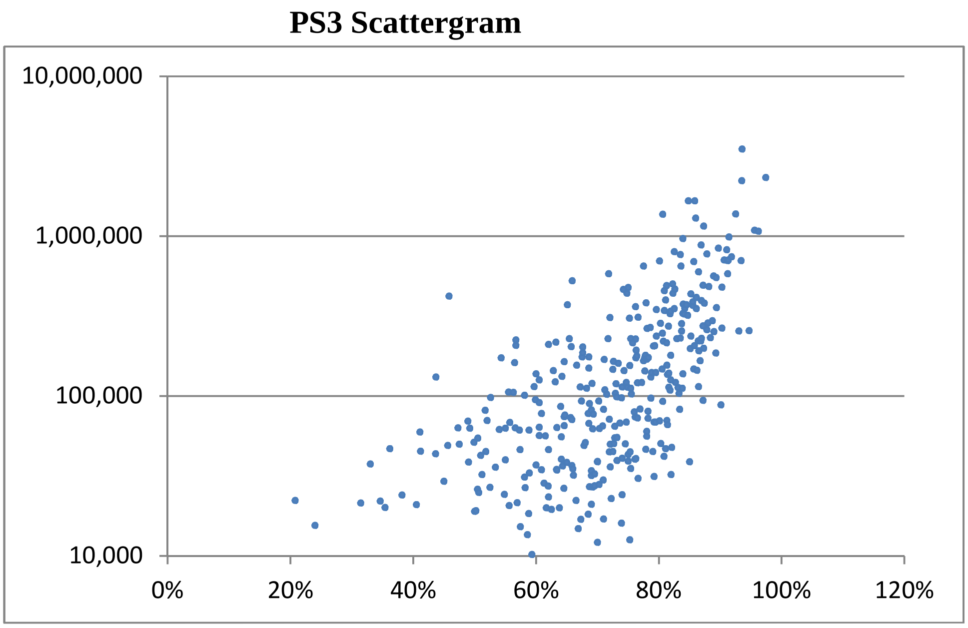
Results

Wii Scattergram



Wii: The coefficient of correlation is 0.309 (on 623 degrees of freedom) – this latter simply means that there were 625 observations. The coefficient is highly significant (a chance of such a configuration being thrown up at random in excess of 1 in 1000!) but this also happens to be the poorest of the three set-ups. Looking at the scatter plot of log (sales) *versus* score, the plot is rather square with some quite high sales associated with low scores.

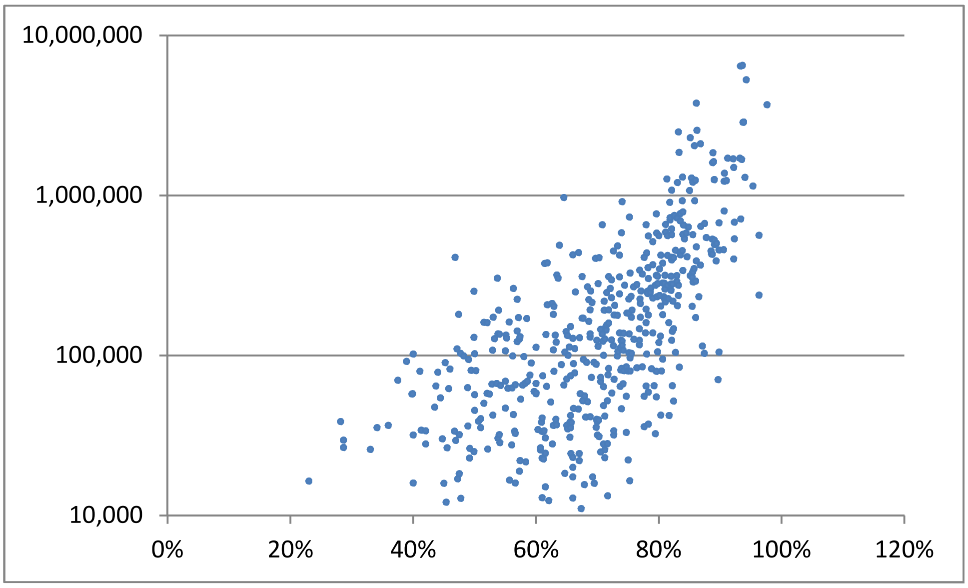
It is worth noting the average and range of unit numbers sold: a mean of 290 thousand (range – 10 thousand to 12.75 million). It is often more useful to consider the median and inter-quartile range – the median is the central figure, while the inter-quartile range represents the 25% and 75% points of the ordered sales. These are c. 100 thousand for the median with the iqr ranging from near 40 thousand to 275 thousand.



PS3: The coefficient of correlation is 0.640 (on 344 degrees of freedom). This is better than for the Wii in the sense that the association is much clearer, although the plot tends to show quite a wide base, i.e., low sales for quite a range of scores.

For the PS3 the mean is around 220 thousand ranging from about 10 thousand to 3.5 million. The median is again lower, at 109 thousand with the iqr ranging from below 50 thousand to nearly a quarter of a million.

Xbox 360 Scattergram



Xbox: The correlation coefficient is 0.661 (on 501 degrees of freedom). This is similar to that for the PS3, and the shape of the scattergram is quite similar.

The mean number of sales is one-third of a million, ranging from 11 thousand to 6.5 million. The median is 130 thousand with iqr from near 60 thousand to over 300 thousand.

Further comments

In Excel the trend line is not strictly related to association but represents an implied dependency. For example, if you fit a line of *y* against *x* where *y* represents the vertical axis you will get a different line from fitting *x* against *y*. In a sense, the association line would split the two. I am a little reluctant to fit a single line to any of these data, partly because it can be misleading, but also because the shape of the association scatterplot does seem to suggest that there is much less association at low sales (a poor game, not on sale for long, or simply did not catch on) whereas at high sales – high score there is obviously a much stronger link.

Dr John Fenlon 2 June 2010
Graphs inserted from detailed worksheets

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